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Timber Resource of the Indiana Knobs Unit, 1986

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Forestry DNR INDIANA DEPARTMENT OF NATURAL RESOURCES

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FOREWORD

Forest Inventory and Analysis (FIA) is a continuing endeavor as mandated by the Renewable Forest and Rangeland Resources Planning Act of 1974. Prior inventories were mandated by the McSweeney-McNary Forest Research Act of 1928. The objective of FIA is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and depletions. Up-to-date resource information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for forest resource evaluation in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Fieldwork for the Indiana Statewide forest inventory was begun in July 1985 and completed in December 1986. Reports on the two previous inventories of Indiana's timber resource are dated 1950 and 1967.

More accurate survey information was obtained during the 1986 survey than otherwise would have been feasible because of intensified field sampling. Such sampling was made possible by additional funding provided by the Indiana State Legislature through the Division of Forestry, Indiana Department of Natural Resources. The Department also surveyed primary wood-using plants in the State. Data from this survey were used to help estimate the quantity of timber products harvested in the State. Indiana Department of Natural Resources personnel have also assisted in training field personnel, analyzing information obtained from the survey, and preparing this report.

Aerial photos used in the Indiana Knobs Forest Inventory were furnished by the Hoosier National Forest and the USDA Agricultural Stabilization and Conservation Service.

Information in this report includes the most commonly used Forest Inventory and Analysis statistics. However, additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay the retrieval costs. These costs will vary depending on the complexity of the request, from less than $100 for a relatively simple request to $2,000 for a complex retrieval involving the services of a Forest Inventory and Analysis computer programmer. If requests for data conflict with ongoing Forest Inventory and Analysis work, they will be scheduled so as to minimize the impact on the work unit.

Requests for unpublished information may be directed to:

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Area served: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin.

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TIMBER RESOURCE OF THE INDIANA KNOBS UNIT, 1986

Mark H. Hansen, *and* Mark F. Golitz

HIGHLIGHTS

Forest Area

- Forest land was 1.8 million acres (43.5 percent of the Knobs Unit's total land area) in 1986.
- Timberland (formerly called commercial forest land) decreased 1.6 percent between 1967 and 1986, from 1,769,200 to 1,741,100 acres.
- Reserved timberland totaled 64,200 acres in 1986, 3.6 percent of the Unit's forest land. There were only 26,900 acres of reserved timberland in the Unit in 1967.
- Timberland represented 42 percent of the Unit's total land area.
- Perry County (fig. 1) contained the largest area of timberland in 1986 (152,500 acres) as it did in 1967 (142,800).
- Farmers and miscellaneous private individuals own 1,218,800 acres, 70 percent of the timberland (fig. 2). A new definition of farm ownership shifted much of what was previously in the farmer category into the miscellaneous private category.
- Of the 1,386,900 acres of privately owned timberland, 58 percent or 798,400 acres were owned by parties with between 11 and 100 acres of timberland.
- Sixty-nine percent (956,100 acres) of the privately owned timberland had been owned by its present owner less than 20 years.
- The predominant forest type, oak-hickory, accounted for 43 percent (741,300 acres) of the total timberland in 1986, down from 71 percent of the

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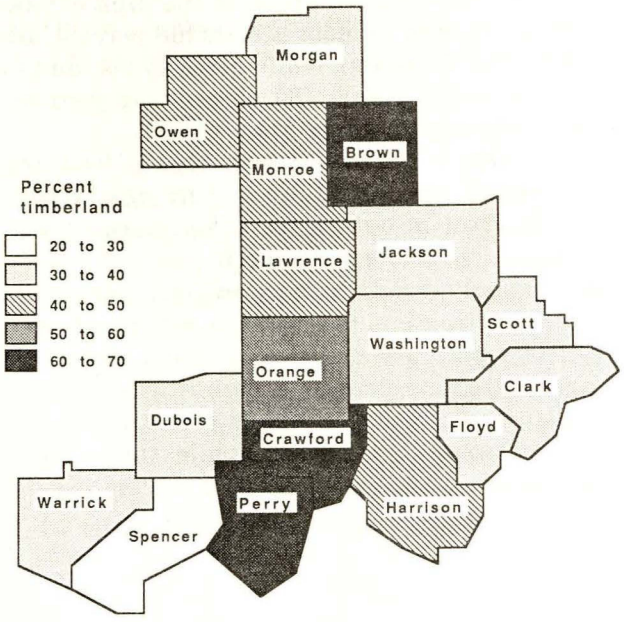

Figure 1.—*Timberland area as a percent of total land area, Indiana, Knobs Unit, 1986.*

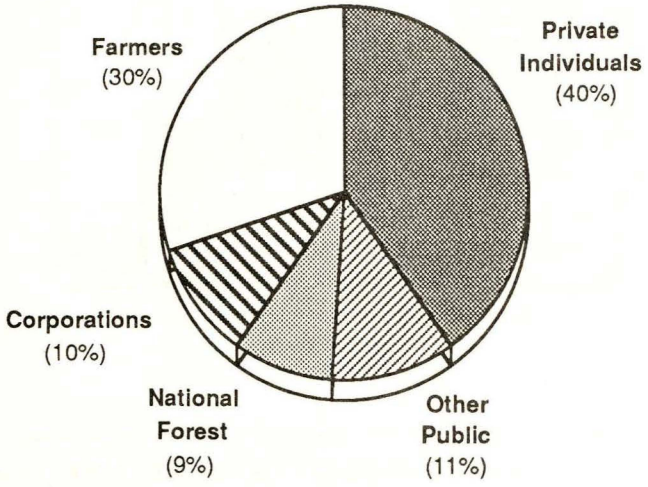

Figure 2.—*Area of timberland by owner, Indiana, Knobs Unit, 1986.*

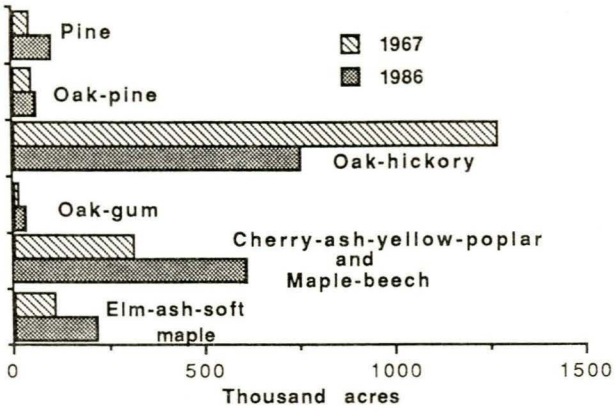

Figure 3.—*Area of timberland by forest type, 1967 and 1986, Indiana, Knobs Unit.*

total in 1966 (fig. 3). Much of the area of oak-hickory type is in older stands (68 percent are older than 50 years), while other types tend to be in younger stands (80 percent are younger than 70 years) (fig. 4).

The area of the oak-hickory type is declining for several reasons. Many mature oak-hickory stands where no cutting has taken place are succeeding into the maple-beech and cherry-ash-yellow-poplar types. In many oak-hickory stands where cutting has taken place, soft maple and yellow-poplar are the predominant species to regenerate, producing a different forest type.

- The area of sawtimber stands increased 28 percent between inventories, while the area of poletimber stands decreased 40 percent (fig. 5).

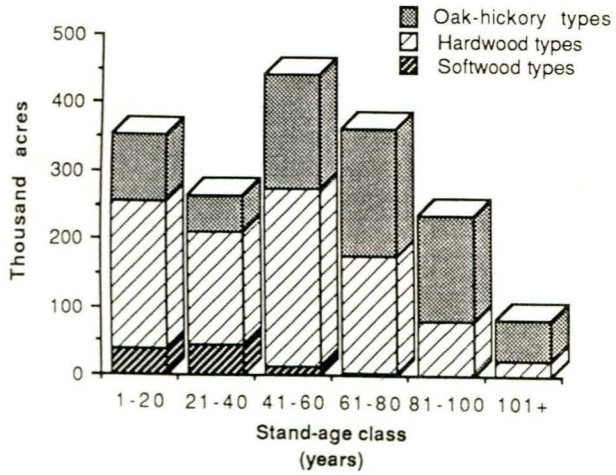

Figure 4.—*Area of timberland by forest type and stand-age class, Indiana, Knobs Unit, 1986.*

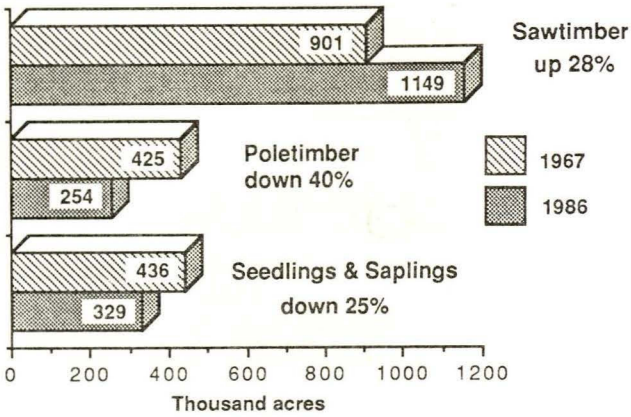

Figure 5.—*Area of timberland by stand-size class, 1967 and 1986, Indiana, Knobs Unit.*

Volume

- The volume of growing stock on timberland was 2.3 billion cubic feet in 1986, up 33 percent from 1967[1].
- Sawtimber volume on timberland totaled 8.7 billion board feet[2] in 1986, up 48 percent from 1967[3].
- Hardwoods accounted for 95 percent of both the growing-stock volume (2.2 billion cubic feet) and the sawtimber volume (8.3 billion board feet) on the Unit's timberland.
- The oaks account for 42 percent (3.7 billion board feet) of the total sawtimber volume.
- Growing-stock volume of the oaks and hickories increased 3 percent between 1967 and 1986, while all other species increased 77 percent over the same period (fig. 6). The harvesting pressure on oak and hickory is apparent, as these species' total share of inventory declined from 60 to 47 percent of growing stock between 1967 and 1986. This decrease in oak as a percentage of the total volume is a major factor in the decline in the area of the oak-hickory forest type.
- Yellow-poplar growing-stock volume increased 160 percent, from 91 million cubic feet in 1967 to 236 million cubic feet in 1986 (fig. 6). The growing-stock volume of yellow-poplar was 5 percent of the total in 1967, compared to 10 percent of the total in 1986.

[1]*Because of changes in volume equations, 1967 growing-stock volumes have been adjusted from those published after the 1967 survey to conform to 1986 volumes.*

[2]*International 1/4-inch rule.*

[3]*Because of changes in survey procedures and volume equations, 1967 sawtimber volume figures have been adjusted from those published after the 1967 survey to conform to 1986 data.*

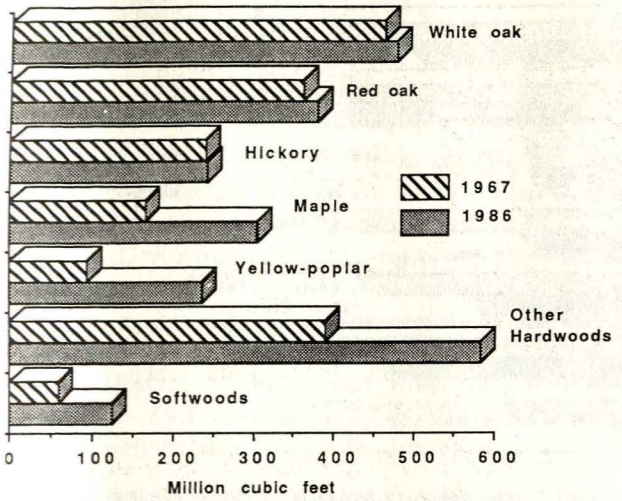

Figure 6.—*Growing-stock volume by species group, 1967 and 1986, Indiana, Knobs Unit.*

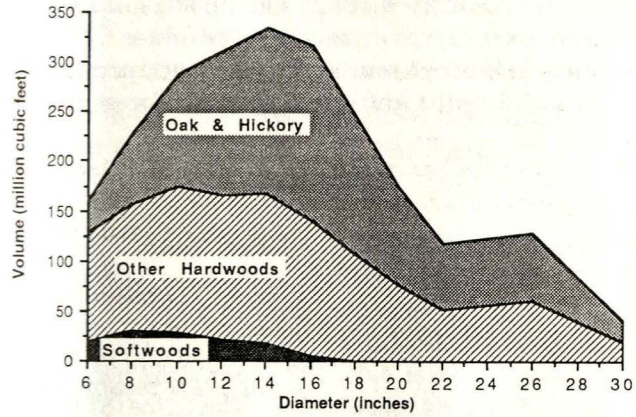

Figure 7.—*Growing-stock volume by species group and diameter, Indiana, Knobs Unit, 1986.*

- Growing-stock volume on timberland averaged 1,345 cubic feet per acre in 1986, compared to 997 cubic feet per acre in 1967, an increase of 35 percent.
- Sawtimber volume per acre increased 51 percent, from 3,306 board feet in 1967 to 4,990 board feet in 1986.
- Fifty-seven percent (4.9 billion board feet) of the sawtimber volume on timberland is in trees between 11 and 17 inches d.b.h. (fig. 7).
- Forty-six percent (4.0 billion board feet) of the sawtimber volume is in stands aged 40 to 70 years.
- The volume in live cull trees is 208 million cubic feet; salvable dead tree volume is 42 million cubic feet.
- Private parties (all non-public owners) own 78 percent (1.8 billion cubic feet) of the growing-stock volume.
- The oak-hickory forest type contains 43 percent of the sawtimber volume (3.7 billion board feet).

Stand Conditions

- Net annual growth of growing-stock trees on timberland was 60 million cubic feet, 2.6 percent of inventory in 1985. In 1966, net annual growth of growing-stock trees was 42.7 million cubic feet, 2.4 percent of inventory.
- Net annual growth of growing-stock trees on timberland averaged 34.4 cubic feet per acre in 1985, up 43 percent from 1966 (24.1 cubic feet per acre) (fig. 8).
- Annual mortality of growing stock amounted to 22 million cubic feet, 1.0 percent of inventory in 1985.

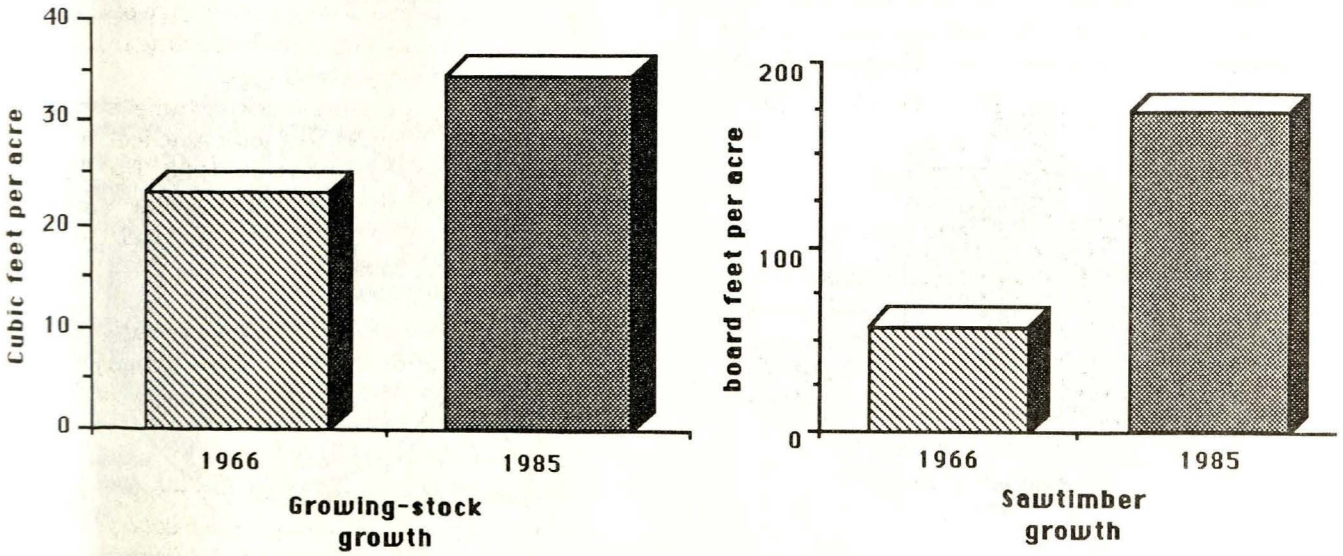

Figure 8.—*Net annual growth on timberland, 1966 and 1985, Indiana, Knobs Unit.*

- Net annual growth of sawtimber on timberland was 302 million board feet, 3.5 percent of inventory in 1985. In 1966, net annual growth of sawtimber was 100 million board feet, 1.7 percent of inventory.
- Net annual growth of sawtimber trees on timberland averaged 174 board feet per acre in 1985, more than three times the rate in 1966 (57 board feet per acre) (fig. 8). This dramatic increase in sawtimber growth was primarily due to ingrowth, the volume of trees that had not yet reached the merchantable diameter limit (9 inches for softwoods, 11 inches for hardwoods) in 1967 but had reached those limits by 1986. This phenomenon is typical of a rapidly maturing second growth forest.
- Annual mortality of sawtimber amounted to 65 million board feet, 0.7 percent of inventory in 1985.

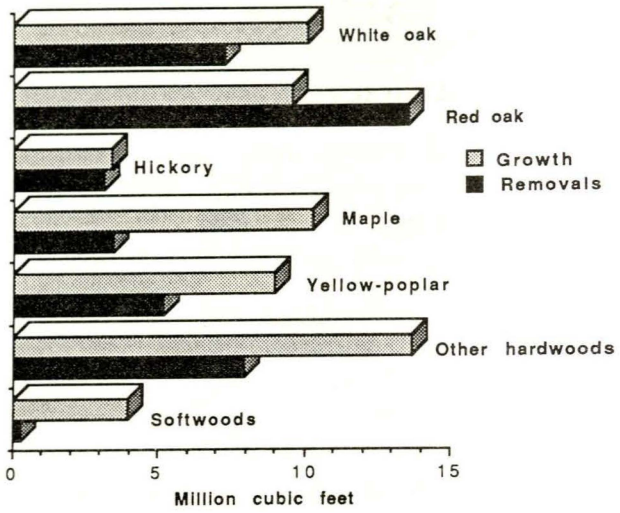

Figure 10.—*Growing-stock growth and removals by species group, Indiana, Knobs Unit, 1985.*

Timber Use

- Timber removals from growing stock totaled 41 million cubic feet in 1985 (1.7 percent of inventory and 68 percent of growth).
- Fifty-seven percent of the growing-stock removals were for saw logs (fig. 9).
- Sawtimber removals totaled 203 million board feet in 1985 (2.3 percent of inventory and 67 percent of growth).
- Oak and hickory growing-stock removals (24 million cubic feet) slightly exceeded growth (23 million cubic feet), but removals in all other species (17 million cubic feet) were less than half of growth (37 million cubic feet) (fig. 10).
- The oaks accounted for 52 percent (105 million board feet) of the sawtimber removals in 1985.
- Fuelwood produced totaled 14.5 million cubic feet in 1984. However, only 9 percent came from growing stock; the rest came from rough, rotten, and dead trees (19 percent), plant residues (38 percent), and other sources (34 percent), primarily tops and limbs and trees from nonforest land.

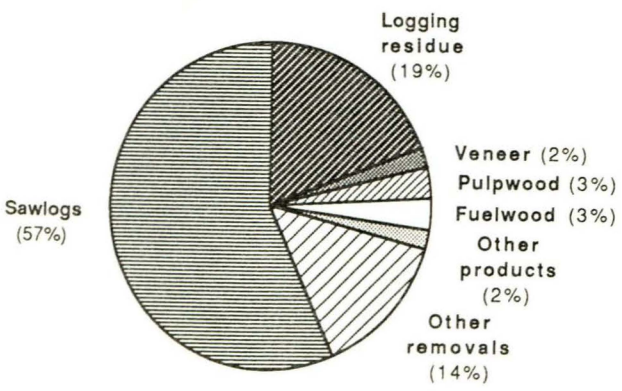

Figure 9.—*Growing-stock removals by item, Indiana, Knobs Unit, 1985.*

Biomass

- Live tree biomass (trees larger than 1 inch in d.b.h.) totaled 136 million green tons (an average of 78.2 green tons per acre) in 1986.
- Highest yields of live tree biomass were in the chestnut scarlet oak (103 green tons per acre), oak-hickory (84 tons), and shortleaf pine (82 tons), forest types.
- Eighty percent (109 million green tons) of all live tree biomass was in growing-stock trees 5 inches d.b.h. and larger (fig. 11).

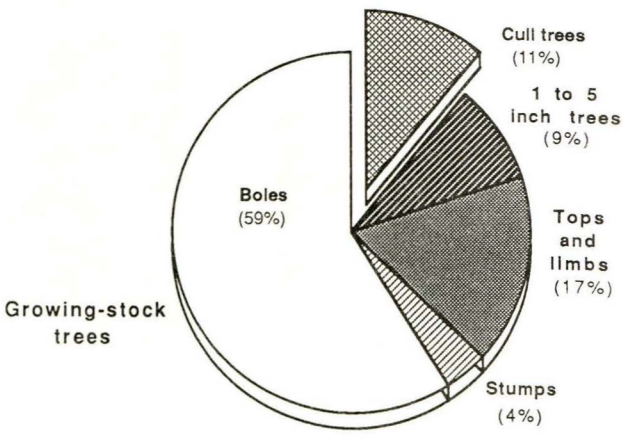

Figure 11.—*All live tree biomass by component, Indiana, Knobs Unit, 1986.*

APPENDIX

Accuracy of Survey

Forest Inventory and Analysis information is based on a sampling procedure designed to provide reliable statistics at the State and survey unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the Knobs Unit in 1986, 2,341.7 million cubic feet, has a sampling error of ±1.95 percent (±45.7 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 2,296.0 and 2,387.4 million cubic feet (2,341.7 ±45.7), there being a one in three chance that this is not the case.

The following tabulation shows the sampling errors for the 1986 Indiana Knobs Forest Inventory:

Item	Unit totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume (1986)	2,341.7	1.95
Growth (1985)	60.0	3.24
Average annual removals (1966-1985)	31.3	7.26
Sawtimber	(Million board feet)	
Volume (1986)	8,688.8	2.39
Growth (1985)	302.2	5.58
Average annual removals (1966-1985)	131.6	7.87
Timberland	(Thousand acres)	
Area (1986)	1,741.1	0.83

As survey data are broken down into sections smaller than Survey Unit totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the Unit. Table 81 shows the sampling errors for estimates smaller than Unit totals. For example, Harrison County, with 132.1 thousand acres (table 3), would have a sampling error of just under 3 percent. Similarly, the sampling error for the growing-stock volume of yellow-poplar in the unit (236.0 million cubic feet, table 30) would be between 5 and 10 percent.

Survey Procedures

Two-phase sampling, using both new and remeasurement ground plots, was used in this inventory.

The major steps in the Indiana Knobs Forest Inventory were as follows:

1. *Aerial photography (phase 1).*

Aerial photographs of the entire area were obtained from the Hoosier National Forest and the USDA Agricultural Stabilization and Conservation Service. Nine-inch square, black and white Panchromatic prints on a scale of 1:40,000 were used throughout the entire unit. The photographs were taken on the following dates:

County	Date	County	Date
Brown	10/80	Morgan	10/80
Clark	6/80	Orange	9/79
Crawford	11/79	Owen	10/80
Dubois	11/79	Perry	11/79
Floyd	10/80	Scott	10/80
Harrison	10/81	Spencer	9/74
Jackson	10/80	Warrick	6/80
Lawrence	9/79	Washington	10/80
Monroe	10/80		

The locations of the plots used in the 1967 inventory were transferred to these new photographs. Photographs were assembled into township mosaics, and a systematic grid of 121 points (190.4 acres per point) was overlaid on each township mosaic. Each of these points (both the new systematic grid points and the old sample plots) was examined by aerial photogrammetrists and classified stereoscopically based on land use. If trees were present, forest type and stand size-density class were recorded. Then all the old sample locations and a sample of the new points were sent to the field for the field crew to verify the photo classification and to take further measurements. A total of 22,933 points (21,877 new and 1,056 old) was examined stereoscopically. The following tabulation summarizes the results of this step of the inventory:

Aerial photo classification	Points classified
Timberland	9,665
Reserved timberland	277
Questionable	253
Nonforest with trees	639
Nonforest without trees	11,834
Water	265
Total	22,933

2. *Plot measurements (phase 2).*

Each plot location was visited on the ground by a Forest Service field crew. They classified the plot based on its current land use and recorded various other descriptive information. The following tabulation summarizes the results of this step of the inventory:

Ground classification	Old plots remeasured	New plots established	Total ground plots taken
Timberland	460	409	869
Reserved timberland	12	45	57
Nonforest with trees	65	62	127
Nonforest without trees	503	525	1,028
Water	16	16	32
Total	1,056	1,057	2,113

On those plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide), a ground plot was established or remeasured. The ground plot consisted of a 10-point cluster covering approximately 1 acre. At each point, trees 5 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot and trees less than 5 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot.

3. *Area estimates.*

Area estimates outside of the Hoosier National Forest were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (phase 1) and corrected by the plot measurements (phase 2). A complete description of this estimation method is presented by Loetsch and Haller[4]. Estimates of area for a particular county are based on the aerial photo points taken in that county, corrected using all the ground plots in the Survey Unit regardless of the county in which they were taken. This was done because there were not enough ground plots in any one county to accurately correct the aerial photo interpretation in that county. Unit-wide correction rates should be accurate at the county level because we have made every effort to ensure that the plot interpretation is consistent throughout the Knobs Unit.

Area estimates within the Hoosier National Forest were obtained from compartment examination records maintained by the Forest Timber Management Staff. This is an intensive area inventory system in which, over a period of years, each stand in the Hoosier is mapped on aerial photographs and then classified by ground visits.

4. *Volume estimates.*

Estimates of volume per acre are made from the trees measured on the 10-point plots. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes are based on equations developed by Smith and Weist[5] for use in Indiana. Board foot International 1/4-inch, board foot Doyle, and cubic foot volume in saw log estimates are developed based on factors derived from full tree measurements taken throughout the Central States (Illinois, Indiana, Iowa, and Missouri) and an equation developed by Wiant and Castenaeda[6]. Biomass estimates are based on equations developed by Smith[7]. These factors are shown in table 1.

5. *Growth and mortality estimates.*

On remeasurement plots, estimates of growth and mortality per acre come from the remeasured diameters of trees and observation of trees that died between inventories. Growth is reported for 1985, the last year before the inventory, and is based on an assumption of constant basal area growth over the remeasurement period. Mortality is reported for 1985 also, and is based on an assumption of constant volume mortality over the remeasurement period.

On new plots, where trees were not remeasured, estimates of growth and mortality were obtained

[4]*Loetsch, F.; Haller, K. E. 1964. Forest inventory, volume 1: Statistics of forest inventory and information from aerial photographs. BLV Verlagsgesellschaft Munch Basle Vienna. 436 p.*

[5]*Smith, W. Brad; Weist, Carol A. 1982. A net volume equation for Indiana. Resour. Bull. NC-63. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 7 p.*

[6]*Wiant, Harry V., Jr.; Castenaeda, Froylan. 1977. Mesavage and Girards volume tables formulated. BLM4. Denver, CO: U.S. Department of Interior, Bureau of Land Management, Denver Service Center: 1-4.*

[7]*Smith, W. Brad. 1985. Factors and equations to estimate forest biomass in the North Central Region. Res. Pap. NC-268. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 6 p.*

Table 1.--Factors for converting net cubic foot volume in growing-stock trees to net board foot volume (International 1/4 inch and Doyle) and net cubic foot volume in saw log portion of sawtimber trees

D.b.h. (Inches)	Net board foot volume				Net cubic foot volume in sawlog	
	International 1/4-inch		Doyle			
	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods
9.0-10.9	5.1587	--	1.8300	--	0.8835	--
11.0-12.9	5.4688	4.9076	2.6526	2.1085	.9533	0.7495
13.0-14.9	5.6519	5.1315	3.4080	2.6800	.9530	.7905
15.0-16.9	5.7234	5.2444	3.9749	3.1258	.9488	.8006
17.0-18.9	5.8094	5.2718	4.5314	3.5071	.9424	.8048
19.0-20.9	5.6641	5.1770	4.7697	3.7644	.9016	.7809
21.0-22.9	5.6942	5.1096	4.9565	4.0580	.8842	.7691
23.0-24.9	5.3753	4.8778	5.1949	4.2229	.7918	.7361
25.0-26.9	5.3753	4.8778	5.9153	4.3566	.7918	.7361
27.0-28.9	5.3753	4.8778	5.3148	4.4843	.7918	.7361
29.0+	5.3753	4.8778	5.8066	4.9115	.7918	.7361

by using the Central States Stand and Tree Evaluation and Modeling System (STEMS)[8,9] to project the growth and mortality of trees for 1 year. The STEMS growth model was adjusted to meet local conditions, using the data from the remeasured plots and a method developed by Smith[10]. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area estimates.

6. *Average annual removals estimates.*

Average annual growing-stock and sawtimber removals (1966 to 1985) were estimated only from the remeasurement plots. These estimates are obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. New plots were not used to estimate removals. Because the remeasurement plots made up only half of the total ground plots, average annual removals estimates have greater sampling errors than volume and growth estimates.

7. *Timber removals, utilization, and timber products output estimates.*

Statistics on timber products output during 1984 came from canvassing (with a formal questionnaire) all the known primary wood-using mills that consume Indiana logs and bolts. Indiana Department of Natural Resources (IDNR) foresters personally canvassed all the known Indiana primary mills (except one pulpmill). IDNR utilization and marketing specialists provided estimates based on prior knowledge and contacts for a few mills that did not furnish complete data.

The North Central Forest Experiment Station mailed a formal questionnaire to the Indiana pulpmill and all known out-of-State mills using Indiana roundwood. Follow-up on nonrespondents was by mail and telephone.

A sample of Illinois households and fuelwood producers provided estimates of fuelwood and post production in Illinois during 1983. Fuelwood and fencepost output in Indiana for 1984 was estimated by extrapolating the study results in Illinois to Indiana.

Wood utilization factors for converting timber products output to removals from growing stock were obtained during a 1984-1985 utilization study in Illinois, a 1971-1972 utilization study in Missouri, a 1966 utilization study in Indiana, and a 1964-1965 utilization study in Michigan.

Because this was a 100-percent sample of all primary wood-using mills, there is no sampling error reported for 1985 removals and timber products. This is not to say that the estimates reported here are totally accurate. Sampling error is a measure of precision, not accuracy, and tells in what range we would expect to obtain an estimate were we to repeat the procedure on a new sample. Because we

[8] *Miner, Cynthia L.; Walters, Nancy R. 1984. STEMS: a nontechnical description for foresters. Res. Pap. NC-252. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 12 p.*

[9] *Shifley, Stephen F. 1987. A generalized system of models forecasting Central States tree growth. Res. Pap. NC-279. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 10 p.*

[10] *Smith, W. Brad. 1983. Adjusting the STEMS regional growth models to improve local predictions. Res. Note NC-297. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 5 p.*

did a complete sample of all mills, were we to repeat the procedure we would expect the same results.

COMPARING INDIANA'S THIRD INVENTORY WITH THE SECOND INVENTORY

Data from new forest inventories are often compared with data from earlier inventories to determine trends in forest resources. However, changes in procedures and definitions between surveys often make it necessary to adjust earlier survey data so that they are comparable to data from the new survey. A consistency check was made for the Indiana Knobs Unit to ensure that the changes observed between inventories reflect actual changes in the resource and not changes in definitions or procedures.

Identifying and Correcting Procedural Changes

Between the 1967 and 1986 inventories of the Indiana Knobs Unit, some procedural changes were made in the method of deriving annual growth and mortality estimates and determining forest type. Also, different volume equations and forest types were used for the two inventories.

New volume equations were developed for Indiana, and these equations were used to compute the 1986 volumes and also to recompute the 1967 volume. The recomputed 1967 growing-stock volume was 2.2 percent greater than that reported in the 1967 report. Volumes for 1967 shown in this report are the recomputed volumes based on new volume equations and observations from the 1967 inventory.

Mortality figures published in the 1967 inventory report were based on field estimates from nonremeasurement plots. Information gathered on remeasurement plots during the current inventory was used to adjust the 1967 mortality figures. This adjustment, together with the new volume equations, also changed the estimate of net growth for the 1967 inventory.

In the 1967 report, fewer forest types were identified than in this report; however, all the types used in this report are subsets of forest types used in the old report. Areas and volumes in the oak-hickory type in 1967 will be in either the oak-hickory, chestnut-scarlet oak, or sassafras-persimmon type in 1986. Areas and volumes in the oak-gum-cypress type in 1967 will be in either the oak-gum or lowland oak type in 1986. Similarly, the 1967 elm-ash-cottonwood type is made up of the elm-ash-soft maple and cottonwood types in 1986; and the 1967 maple-beech-birch type is made up of the maple-beech and cherry-ash-yellow-poplar types in 1986. We could not divide the 1967 area up by the 1985 types, so all comparisons must be made by combining 1986 data together into the 1967 types.

Checking for Consistency

A test was made to ensure that it was possible to move from the adjusted 1967 resource statistics to the 1986 values by means of a computer program for updating and projecting timber volume, growth, and removals. Using the adjusted 1967 volume, growth rates, and removals rates for the period between the two surveys, the program projected the inventory from 1967 to 1986. The program outputs volume, net growth, and removals of growing stock for every year in the period. Thus, inconsistencies in volume, growth, and removals were identified and resolved.

This program estimates how volume, growth, and removals could have logically changed over the inventory period to be consistent with the estimates of past and current volume, growth, and removals, and average annual removals presented in this report. The growing-stock growth used for this program was increased by 6.1 million cubic feet per year in both 1967 and 1986 to account for nontimberland that is converting to timberland. Between 1967 and 1986, we found that 159,000 acres of nontimberland converted to timberland. The growing-stock volume on these lands was 115 million cubic feet in 1986. Removals did not require adjustment because they already include "other removals (see Definition of Terms in Appendix), which includes the volume of timber on lands that converted from timberland to nontimberland. Between 1967 and 1986, we found that 176,000 acres of timberland converted to nontimberland. The growing-stock volume on these lands was 149 million cubic feet in 1966.

Figure 12 is not intended to project beyond 1986, but simply shows one possible way in which volume, growth, and removals may have changed between 1966 and 1986 that is consistent with other information presented in this report. Removals tend to fluctuate from one year to the next, depending on economic conditions. Growth also fluctuates, depending on weather conditions, removals, insect and disease infestations, and other factors. Also, the

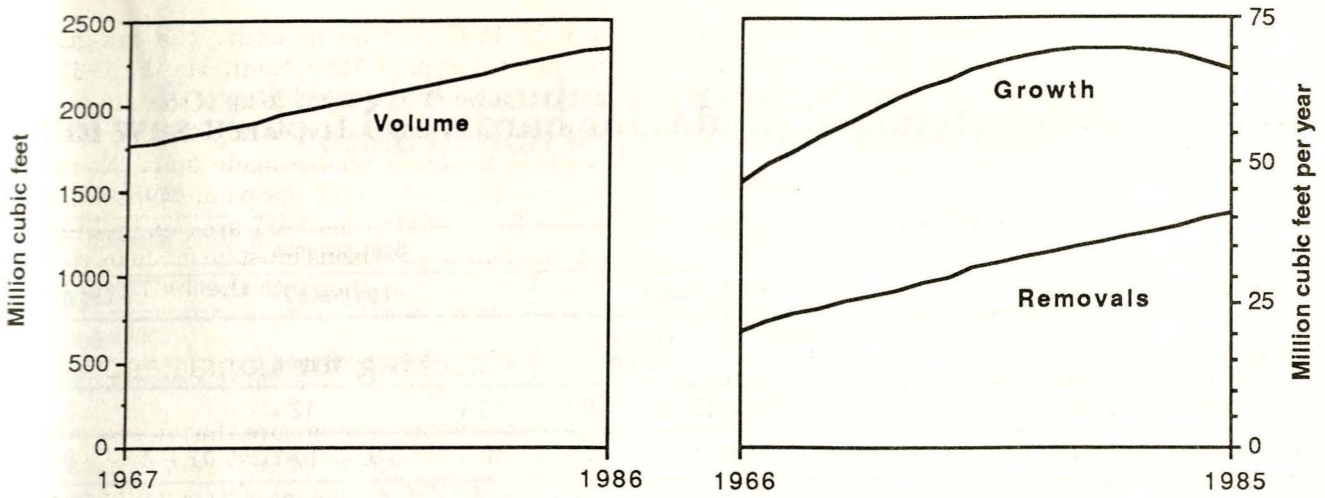

Figure 12.—*Growing-stock volume, growth and removals, Indiana, Knobs Unit, 1966 to 1986.*

past and current volume, growth and removals (which fix the end points of these lines), and average annual removals (which fix the midpoint of the removals line) are only estimates, and each has a sampling error. This figure simply shows that it is possible to move from the old information to the new information in a logical manner.

LOG GRADE

In the Indiana Knobs Unit field crews graded the butt log of every sawtimber tree on every plot. Butt logs were graded on the basis of external characteristics as indicators of quality. Hardwood species were graded according to "Hardwood Log Grades for Standard Lumber."[11] The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards, was graded as follows:

[11] *Vaughn, C. L.; Wollin, C. A.; McDonald, K. A.; Bulgrin, E. H. 1966. Hardwood log grades for standard lumber. Res. Pap. FPL 63. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 52 p.*

Forest Service standard grades for hardwood factory saw logs

Grading factors		Specifications							
		Log grade 1			Log grade 2				Log grade 3
Position in tree		Butts only	Butts and uppers		Butts and uppers				Butts and uppers
Scaling diameter, inches		[1]13-15	16-19	20+	[2]11+		12+		8+
Length without trim, feet			10+		10+	8-9	10-11	12+	8+
Required clear cuttings[3] of each of three best faces[4]	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No Limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep and crook allowance	For logs with less than one-fourth of end in sound defects		15 percent			30 percent			50 percent
	For logs with more than one-fourth of end in sound defects		10 percent			20 percent			35 percent
Maximum scaling deduction			40 percent[5]			50 percent[6]			50 percent

[1]Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.
[2]Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.
[3]A clear cutting is a portion of a face, extending the width of the face, that is free of defects.
[4]A face is one-fourth of the surface of the log as divided lengthwise.
[5]Otherwise #1 logs with 41-60 percent deductions can be #2.
[6]Otherwise #2 logs with 51-60 percent deductions can be #3.

Forest Service standard specifications for hardwood construction logs (tie and timber logs)[1]

Position in tree		Butt and upper
Min. diameter, small end		8 inches +
Min. length, without trim		8 feet
Clear cuttings		No requirements.
Sweep allowance, absolute		One-fourth of the diameter at the small end for each 8 feet of length.
Sound surface defects	Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
	Whorled knots	Any number if sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
	Holes	Any number provided none has a diameter over one-third of the log diameter at point of occurrence, and none extends more than 3 inches into included timber.[2]
Unsound surface defects		Same requirements as for sound defects if they extend into included timber.[2] No limit if they do not.
End defects	Sound	No requirements.
	Unsound	None allowed; log must be sound internally, but will admit one shake not to exceed one-fourth the scaling diameter and will admit a longitudinal split not extending more than 5 inches into the contained timber.

[1]These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary .o subdivide the class into grades.

[2]Included timber is always square, and dimension is judged from small end.

Softwood species were graded according to the following specifications on the following page.

Log Grades for Eastern White Pine

Log grade	Minimum size Diameter	Minimum size Length[1]	Sweep or crook allowance	Total cull allowance including sweep	Maximum weevil injury	Allowable knot size (inches)[2] on three best faces or minimum clearness of four faces
	Inches	*Feet*	--------*Percent*--------		*Number*	*Inches*
1	12 & 13	8-16	20	50	0	Four faces clear full length
	14 +	10-16	20	50	0	Two faces clear full length, or four faces clear 50 percent length (6 feet min. length)[3]
2	6 +	8-16	30	50	0	Sound knots l.e.[4] D/6 and less than 3 inches[5] Unsound knots: l.e. 1½ inches and for: butt, lots l.e. D 12 upper logs l.e. D/10 or four faces clear 50 percent of length
3	6 +	8-16	40	50	8-foot logs 1 weevil 10-foot + logs: 2 weevil	Sound knots l.e. D/3 and less than 5 inches. Unsound knots l.e.D/6 and less than 2½ inches.
4	6 +	8-16	50	50	No limit	No limit

[1]Plus trim.
[2]Disregard all knots less than ½-inch diameter in all grades.
[3]The sum of the diameter of sound knots plus twice the sum of the diameter of unsound knots (in inches) is less than or equal to ½ of the diameter of the log (inches).
[4]l.e. means less than or equal to.
[5]D means d.i.b. of log at location of knot.

LOG GRADES FOR JACK PINE AND RED PINE

Grade 1: logs with three or four clear faces.[12]

Grade 2: logs with one or two clear faces.

Grade 3: logs with no clear faces.

After the tentative log grade is established, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3. Net scale after deduction for defect must be at least 50 percent of the gross contents of the log.

1. *Sweep.* Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one-third the diameter inside bark at small end.

2. *Heart rot.* Degrade any tentative 1 or 2 log grade if conk, massed hyphae, or other evidence of advance heart rot is found anywhere in it.

[12]*A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than ½-inch in diameter, overgrown knots of any size, holes more than ¼-inch in diameter. Faces may be rotated to obtain the maximum number of clear ones.*

LOG GRADES FOR ALL OTHER SOFTWOOD LOGS

Grade 1

1. Logs must be 16 inches in diameter or larger, 10 feet or longer, and with deduction for defect not over 30 percent of gross scale.
2. Logs must be at least 75 percent clear on each of three faces.
3. All knots outside clear cutting must be sound and not over 2-½ inches in size.

Grade 2

1. Logs must be 12 inches in diameter or larger, 10 feet or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.
2. Logs must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Logs must be 6 inches in diameter or larger, 8 feet or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

Note: (A) Diameters are diameter inside bark (d.i.b.) at small end of log.

(B) Percent clear refers to percent clear in one continuous section.

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1 cubic foot = 0.0283 cubic meter.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
1 pound = 0.454 kilogram.
1 ton = 0.907 metric ton.

TREE SPECIES GROUPS IN THE INDIANA KNOBS UNIT[13]

Softwoods
- Jack pine ..... *Pinus banksiana*
- Red pine ..... *Pinus resinosa*
- White pine ..... *Pinus strobus*
- Shortleaf pine ..... *Pinus echinata*
- Virginia pine ..... *Pinus virginiana*
- Baldcypress ..... *Taxodium distichium*
- Eastern redcedar ..... *Juniperus virginiana*
- Other softwoods
  - Scotch pine ..... *Pinus sylvestris*

Hardwoods
- Select white oak
  - White oak[14] ..... *Quercus alba*
  - Swamp white oak[14] ..... *Quercus bicolor*
  - Bur oak[14] ..... *Quercus macrocarpa*
  - Swamp chestnut oak[14] .. *Quercus michauxii*
  - Chinkapin oak[14] ... *Quercus muehlenbergii*
- Other white oak
  - Overcup oak[14] ..... *Quercus lyrata*
  - Chestnut oak[14] ..... *Quercus prinus*
  - Post oak[14] ..... *Quercus stellata*
- Select red oak
  - Cherrybark oak[14] ..... *Quercus falcata* var. *pagodifolia*
  - Northern red oak[14] ..... *Quercus rubra*
- Other red oaks
  - Scarlet oak[14] ..... *Quercus coccinea*
  - Northern pin oak[14] ... *Quercus ellipsoidalis*
  - Southern red oak[14] ..... *Quercus falcata*
  - Shingle oak[14] ..... *Quercus imbricaria*
  - Black oak[14] ..... *Quercus velutina*
  - Blackjack oak[14] ..... *Quercus marilandica*
  - Pin oak[14] ..... *Quercus palustris*
- Select hickory
  - Pecan[14] ..... *Carya illinoensis*
  - Shellbark hickory[14] ..... *Carya laciniosa*
  - Shagbark hickory[14] ..... *Carya ovata*
  - Mockernut hickory[14] ..... *Carya tomentosa*
- Other hickory
  - Bitternut hickory[14] ..... *Carya cordiformis*
  - Pignut hickory[14] ..... *Carya glabra*
- Birch
  - Yellow birch[14] ..... *Betula alleghaniensis*
  - River birch[14] ..... *Betula nigra*
- Hard maple
  - Black maple[14] ..... *Acer nigra*
  - Sugar maple[14] ..... *Acer saccharum*
- Soft maple
  - Red maple[15] ..... *Acer rubrum*
  - Silver maple[15] ..... *Acer saccharinum*
- Ash
  - Black ash[15] ..... *Fraxinus nigra*
  - Blue ash[14] ..... *Fraxinus quadrangulata*
  - White ash[14] ..... *Fraxinus americana*
  - Green ash[14] ..... *Fraxinus pennsylvanica*
- Cottonwood[15] ..... *Populus deltoides*
- Aspen
  - Bigtooth aspen[15] .... *Populus grandidentata*
  - Quaking aspen[15] ..... *Populus tremuloides*
  - Balsam poplar[15] ..... *Populus balsamifera*
- Basswood
  - American basswood[15] ..... *Tilia americana*
  - White basswood[15] ..... *Tilia heterophylla*
- Beech[14] ..... *Fagus grandifolia*
- Black walnut[14] ..... *Juglans nigra*
- Black cherry[15] ..... *Prunus serotina*
- Butternut[15] ..... *Juglans cinerea*
- Elm
  - Winged elm[15] ..... *Ulmus alata*
  - American elm[15] ..... *Ulmus americana*
  - Siberian elm[15] ..... *Ulmus pumila*
  - Slippery elm[15] ..... *Ulmus rubra*
  - Rock elm[14] ..... *Ulmus thomasii*
- Hackberry[15] ..... *Celtis occidentalis*
- Sycamore[15] ..... *Platanus occidentalis*
- Yellow-poplar[15] ..... *Liriodendron tulipifera*
- Black willow[15] ..... *Salix nigra*
- Sweetgum[15] ..... *Liquidambar styraciflua*
- Tupelo
  - Black tupelo[15] . *Nyssa sylvatica* var. *sylvatica*

[13] *The common and scientific names are based on: Little, Elbert L. 1979. Check list of native and naturalized trees of the United States. Agric. Handbk. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.*

[14] *This species is considered a hard hardwood, with an average specific gravity greater than 0.50.*

[15] *This species is considered a soft hardwood, with an average specific gravity of 0.50 or less.*

Swamp tupelo[15] . *Nyssa sylvatica* var. *biflora*
Persimmon[14] . . . . . *Diospyros virginiana*
Sassafras[15] . . . . . *Sassafras albidum*
Other hardwoods
Ohio buckeye[15] . . . . . *Aesculus glabra*
Boxelder[15] . . . . . *Acer negundo*
Kentucky coffeetree[14] . *Gymnocladus dioicus*
Black locust[14] . . . . . *Robinia pseudoacacia*
White mulberry[15] . . . . . *Morus alba*
Red mulberry[15] . . . . . *Morus rubra*
Flowering dogwood[14] . . . . . *Cornus florida*
Honeylocust[14] . . . . . *Gleditsia triacanthos*
Northern catalpa[15] . . . . . *Catalpa speciosa*
European alder[15] . . . . . *Alnus glutinosa*
Noncommercial species[16]
Osage-orange . . . . . *Maclura pomifera*
Eastern hophornbeam . . . *Ostrya virginiana*
Apple . . . . . *Malus* spp.
American hornbeam . *Carpinus caroliniana*
Wild plum . . . . . *Prunus* spp.
Eastern redbud . . . . . *Cercis canadensis*
Pawpaw . . . . . *Asimina triloba*

DEFINITION OF TERMS

Average annual removals from growing stock.—The average net growing-stock volume in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other uses (see other removals). Average annual removals of growing stock are reported for a period of several years (1966 to 1985 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures).

Average annual removals from sawtimber.—The average net board foot sawtimber volume of live sawtimber trees removed annually for forest products (including roundwood products and other uses (see other removals). Average Mannual removals of sawtimber are reported for a period of several years (1966 to 1985 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures).

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The above-ground volume of all live trees (including bark and foliage) reported in green tons. Biomass is made up of 7 components:

Growing-stock stumps.—Biomass of a growing-stock tree 1-foot stump.

Growing-stock bole.—Biomass of a growing-stock tree from a 1-foot stump to a variable 4-inch top.

Growing-stock tops and limbs.—Biomass of a growing-stock tree from a 1-foot stump minus the growing-stock bole.

Cull stumps.—Biomass of a cull tree 1-foot stump.

Cull bole.—Biomass of a cull tree from a 1-foot stump to a variable 4-inch top.

Cull tops and limbs.—Biomass of a cull tree from a 1-foot stump minus the cull bole.

1- to 5-inch trees.—Biomass of all live trees from 1- to 5-inches in diameter at breast height.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, osage-orange and redbud.)

Commercial forest land.—(See timberland).

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Cropland.—Land under cultivation within the past 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

Cull.—Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

Diameter classes.—A classification of trees based on diameter outside bark, measured at breast height (4½ feet above the ground). (Note: D.b.h. is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.)

Farm.—Any place from which $1,000 or more of agricultural products were produced and sold during the year.

Farmer-owned land.—Land owned by farm operators. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had

[16] *Individual noncommercial species were not classified as soft or hard hardwoods. Since they are predominately hard hardwoods, the entire group was classed as hard.*

such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. Also see definitions for tree, land, timberland, reserved timberland, stocking, and water.

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest type.—A classification of forest land based on the species forming a plurality of live tree stocking. Major forest types in the State are:

Jack-red-white pine.—Forests in which jack, red or white pine, singly or in combination, comprise a plurality of the stocking. (These species are generally found in plantations in Indiana.)

Shortleaf pine.—Forests in which shortleaf pine comprises a plurality of the stocking. (Primarily plantations in Indiana.)

Scotch-Virginia pine.—Forests in which Scotch and Virginia pines and eastern redcedar, singly or in combination, comprise a plurality of the stocking. (Common associates include oak, yellow-poplar, red maple, sassafras, and white pine.)

Oak-pine.—Forests in which hardwoods (usually white, scarlet, chestnut, northern red or black oaks), singly or in combination, comprise a plurality of the stocking but where pines or eastern redcedar comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, sassafras, and yellow-poplar.)

Oak-hickory.—Forests in which upland oaks or hickories, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in white, Scotch, and Virginia pines or eastern redcedar. (Common associates include yellow-poplar, elm, maple, black walnut, black-locust, and sassafras.)

Chestnut-scarlet oak.—Forests in which chestnut oak or scarlet oak, singly or in combination, comprise a plurality of the stocking. (Common associates include eastern redcedar, black oak, white oak, and hickory.)

Sassafras-persimmon.—Forests in which sassafras and persimmon, singly or in combination, comprise at least 50 percent of the stocking. (Common associates include oak, yellow-poplar, elm, maple, and eastern redcedar.)

Oak-gum.—Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or cypress, singly or in combination, comprise a plurality of the stocking. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Swamp chestnut-cherrybark oak.—Bottomland forests in which wet site oaks such as swamp, chestnut, cherrybark, and pin oak, singly or in combination, comprise a plurality of the stocking. (Common associates are swamp white oak, bur oak, soft maple, and sycamore.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, soft maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. (Common associates include boxelder, willow, sycamore, and beech.)

Cottonwood.—Forests in which cottonwood comprises at least 50 percent of the stocking. (Associates include willow, elm, soft maple, and ash.)

Maple-beech.—Forests in which hard maple or beech, singly or in combination, comprise a plurality of the stocking. (Common associates include soft maple, elm, and basswood.)

Cherry-ash-yellow-poplar.—Forests in which black cherry, white ash, and yellow-poplar, singly or in combination, comprise a plurality of the stocking. (Common associates include oak, maple, black walnut, beech, basswood, and sycamore.)

Gross area.—The entire area of land and water as determined by the Soil Conservation Service, 1980.

Growing-stock trees.—Live trees of commercial species that meet specified standards of size, quality, and merchantability. (Note: Excludes rough and rotten trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5 inches d.b.h. and over, from one foot above the ground to a minimum 4 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to standard cords by dividing by 79. One standard cord is 128 cubic feet of stacked wood, including bark and air.

Hard hardwoods.—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple and hickories.

Hardwoods.—Dicotyledonous trees, usually broadleaved and deciduous. See soft hardwoods and hard hardwoods.

Idle farmland.—Includes former cropland, orchards, improved pastures, and farm sites not tended within the past 2 years and presently less than 16.7 percent stocked with trees.

Improved pasture.—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing of trees or brush and less than 16.7 percent stocked with live trees.

Industrial wood.— All roundwood products, except fuelwood.

Land.—A. *Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area. This is the same definition that the Soil Conservation Service uses in the National Resource Inventory. Bureau of Census estimates of total land area where used in 1967; Soil Conservation Service estimates were used for 1986.

B. *Forest Inventory and Analysis.* The same as the Soil Conservation Service, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Live trees.—Growing-stock, rough, and rotten trees 1-inch d.b.h. and larger.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

Logging residues.—The unused growing stock portions of trees cut or killed by logging.

Maintained road.—Any road, hard-topped or other surfaces, that is plowed or graded at least once a year. Includes rights-of-way that are cut or treated to limit herbaceous growth.

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw log section that meets pulpwood or saw log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land.

Mortality.—The volume of sound wood in growing-stock and sawtimber trees that die annually.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.)

a. *Nonforest land without trees.*—Nonforest land with no live trees present.

b. *Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Timberland less than 16.7 percent stocked with growing-stock trees.

Other removals.—Growing-stock trees removed but not utilized for products, or trees left standing but "removed" from the timberland classification by land use change. Examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Ownership.—Property owned by one owner regardless of the number of parcels in a specified area.

Ownership size class.—The amount of timberland owned by one owner, regardless of the number of parcels.

Owner tenure.—The length of time a property has been held by the owner.

Pasture.—Land presently used for grazing or under cultivation to develop grazing.

Pastured timberland.—Timberland for which the primary use is wood production, but is presently used for grazing.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: cedar barrens.

Xeromesic sites.—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate.

Hydromesic sites.—Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: better drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: frequently flooded river bottoms and cypress swamps.

Plant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stands.—(See stand-size class.)

Poletimber trees.—Growing-stock trees of commercial species at least 5 inches d.b.h. but smaller than sawtimber size.

Reserved timberland.—Forest land sufficiently productive to qualify as timberland but withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing. Formerly called productive-reserved forest land.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs, and bolts; cooperage logs and bolts; pulpwood; fuelwood; piling; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead trees.—Standing or down dead trees considered merchantable by regional standards.

Saplings.—Live trees 1 to 5 inches d.b.h.

Sapling-seedling stands.—(See stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7 inches (9 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw log portion.—That part of the bole of sawtimber trees between the stump and the saw log top.

Saw log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7 inches d.o.b. for softwoods and 9 inches d.o.b. for hardwoods.

Sawtimber stands.—(See stand-size class.)

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9 inches d.b.h. Hardwoods must be at least 11 inches d.b.h.

Sawtimber volume.—Net volume of the saw log portion of live sawtimber in board feet, International ¼-inch rule (unless specified otherwise) from stump to a minimum 7 inches top diameter outside bark (d.o.b.) for softwoods and a minimum 9 inches top d.o.b. for hardwoods.

Seedlings.—Live trees less than 1 inch d.b.h. that are expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—Sawtimber-size trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Site class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Soft hardwoods.—Hardwood species with an average specific gravity less than 0.50 such as gum, yellow-poplar, cottonwood, red maple, basswood, and willow.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-area class.—The extent of a continuous forested area of the same forest type, stand-size class, and stand-density class.

Stand-size class.—A classification of stocked (see stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

a. *Sawtimber stands.*—Stands with half or more of live stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. *Poletimber stands.*—Stands with half or more live stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

c. *Sapling-seedling stands.*—Stands with more than half of the live stocking in saplings and/or seedlings.

State land.—Land owned either by States or leased to them, for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of trees is 130.0 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100.0 to 129.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 60.0 to 99.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 59.9 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Timberland.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as timberland are capable of producing more than 20 cubic feet per acre per year of annual growth when managed. Currently inaccessible and inoperable areas are included except when the areas involved are small and unlikely to become suitable for producing industrial wood in the foreseeable future.) Formerly called commercial forest land. Also see definition of pastured timberland.

Timber removals from growing stock.—The net volume of growing stock in growing-stock trees removed for forest products (including roundwood products and logging residues) and for other uses (see other removals). Timber removals from growing stock are reported for a single year (1985 in this report) and are based on information obtained from a survey of primary wood-using mills (see Survey Procedures).

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products (including roundwood products and logging residues) and for other uses (see other removals). Timber removals from sawtimber are reported for a single year (1985 in this report) and are based on information obtained from a survey of primary wood-using mills (see Survey Procedures).

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Trees.—Woody plant having a well-developed stem and usually more than 12 feet tall at maturity.

Tree biomass.—The total aboveground weight (including the bark) of all trees from 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark) from a 1-foot stump for trees more than 5 inches in diameter.

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Upper stem portion.—That part of the bole of sawtimber trees above the saw log top to a minimum top diameter of 4 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; schoolyards; cemeteries; roads; railroads; airports; beaches; powerlines and other

rights-of-way; or other nonforest land not included in any other specified land use class.

Urban forest land.—Land that would otherwise meet the criteria for timberland, but is in an urban-suburban area surrounded by commercial, industrial, or residential development.

Water.—(a) *Bureau of the Census.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide. This is the same definition that the Soil Conservation Service uses in the National Resource Inventory. Bureau of Census estimates of total water area were used in 1967; Soil Conservation Service estimates were used for 1986.

(b) *Noncensus.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

Windbreaks.—A group of trees whose primary use is to protect buildings currently in use.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

Woodland.—Forest land incapable of producing 20 cubic feet per acre of annual growth or of yielding crops of industrial wood under natural conditions because of adverse site conditions. (Note: Adverse conditions include shallow soil, dry climate, poor drainage, high elevation, steepness, and rockiness.) Formerly called unproductive forest land.

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(In thousand acres)

Land class	1967	1986
Forest land		
Timberland		
Pine	38.6	95.7
Oak-pine	46.0	54.2
Oak-hickory	1,262.0	741.3[1/]
Oak-gum	9.1	27.7[2/]
Elm-ash-soft maple	99.9	207.0[3/]
Maple-beech	305.8	605.5[4/]
Nonstocked	7.8	9.7
Subtotal	1,769.2	1,741.1
Reserved timberland	26.9	64.2
Total	1,796.1	1,805.3
Nonforest land		
Cropland	1,431.6	1,325.0
Pasture and range	448.7	394.6
Other	515.8	623.2
Total	2,396.1	2,342.8
Total land	4,192.2[5/]	4,148.1[6/]
Water	2.4[5/]	38.8[6/]
Total land and water	4,194.6[5/]	4,186.9[6/]

[1/] Includes all the 1986 oak-hickory, chestnut-scarlet oak, and sassafras-persimmon types.

[2/] Includes all the 1986 oak-gum-cypress and lowland oak types.

[3/] Includes all the 1986 elm-ash-soft maple and cottonwood types.

[4/] Includes all the 1986 maple-beech and cherry-ash-yellow-poplar types.

[5/] 1960 Bureau of Census.

[6/] 1982 National Resource Inventory, Soil Conservation Service.

Table 3.--Area of timberland by county, Knobs Unit, Indiana, 1967 and 1986

(In thousand acres)

County	1967	1986
Brown	133.3	131.6
Clark	92.1	84.9
Crawford	112.8	119.3
Dubois	96.7	93.0
Floyd	36.6	34.5
Harrison	130.9	132.1
Jackson	121.9	120.6
Lawrence	125.5	125.3
Monroe	133.8	117.5
Morgan	91.9	86.7
Orange	118.4	129.1
Owen	113.8	107.5
Perry	142.8	152.5
Scott	45.1	43.0
Spencer	67.8	62.5
Warrick	75.5	81.4
Washington	130.3	119.6
All counties	1,769.2	1,741.1

Table 4.--Area of timberland by stand-size class, Knobs Unit, Indiana, 1967 and 1986

(In thousand acres)

Stand-size class	1967	1986
Sawtimber	900.8	1,148.7
Poletimber	425.1	254.0
Sapling & seedling	435.5	328.7
Nonstocked	7.8	9.7
All classes	1,769.2	1,741.1

Table 5.--Area of land by land use class, Knobs Unit, Indiana, 1986

(In thousand acres)

Land use class	Land area
Forest land	
Timberland	1,741.1
Reserved timberland	64.2
Total	1,805.3
Nonforest land	
Nonforest with trees	
Cropland with trees	19.6
Improved pasture with trees	52.2
Wooded strips	28.0
Idle farmland with trees	13.8
Marsh with trees	1.9
Urban forest	16.2
Urban and other with trees	61.4
Windbreaks	15.2
Wooded pasture	35.0
Subtotal	243.3
Nonforest without trees	
Cropland without trees	1,305.4
Improved pasture without trees	307.4
Idle farm without trees	91.9
Other farm-farmstead	62.3
Urban and other	306.9
Noncensus water	25.6
Subtotal	2,099.5
Total	2,342.8
Total land	4,148.1
Water[1/]	38.8
Total land and water[1/]	4,186.9

[1/] 1982 National Resource Inventory, Soil Conservation Service, USDA.

Table 6.--Area of land by county and major land use class, Knobs Unit, Indiana, 1986

County	Land area	Forest land				Nonforest land with trees	Nonforest land with trees as a percent of land area	Sampling error for timberland
		All forest land	Reserved timberland	Timberland	Timberland as a percent of land area			
	Thousand acres				Percent	Thousand acres	Percent	Percent
Brown	199.2	150.0	18.4	131.6	66.1	10.4	5.2	3.02
Clark	240.8	85.9	1.0	84.9	35.3	14.2	5.9	3.76
Crawford	196.1	120.8	1.5	119.3	60.8	7.8	4.0	3.17
Dubois	274.8	93.8	0.8	93.0	33.8	15.2	5.5	3.59
Floyd	95.8	34.9	0.4	34.5	36.0	14.2	14.8	5.90
Harrison	311.0	135.2	3.1	132.1	42.5	17.1	5.5	3.01
Jackson	327.8	125.2	4.6	120.6	36.8	17.2	5.2	3.15
Lawrence	289.3	126.8	1.5	125.3	43.3	15.4	5.3	3.09
Monroe	246.4	130.8	13.3	117.5	47.7	13.3	5.4	3.20
Morgan	261.6	88.2	1.5	86.7	33.1	18.3	7.0	3.72
Orange	254.7	131.5	2.4	129.1	50.7	13.3	5.2	3.05
Owen	247.1	110.3	2.8	107.5	43.5	15.7	6.4	3.34
Perry	244.2	153.8	1.3	152.5	62.4	9.7	4.0	2.80
Scott	122.5	45.6	2.6	43.0	35.1	6.9	5.6	5.28
Spencer	256.2	65.0	2.5	62.5	24.4	14.8	5.8	4.38
Warrick	250.4	84.0	2.6	81.4	32.5	16.8	6.7	3.84
Washington	330.2	123.5	3.9	119.6	36.2	23.0	7.0	3.17
All counties	4,148.1	1,805.3	64.2	1,741.1	42.0	243.3	5.9	.83

Table 7.--Area of timberland by county and ownership class, Indiana, 1986

(In thousand acres)

County	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. private-corp.	Misc. private-indiv.
Brown	131.6	14.4	10.3	23.3	0.3	2.1	29.8	9.3	42.1
Clark	84.9	--	4.1	15.9	0.3	--	23.7	7.7	33.2
Crawford	119.3	19.5	8.3	12.6	0.3	2.4	27.2	8.2	40.8
Dubois	93.0	0.3	6.2	4.5	0.3	0.1	30.8	9.8	41.0
Floyd	34.5	--	--	--	0.1	0.2	14.5	4.3	15.4
Harrison	132.1	--	--	13.9	0.5	1.0	41.4	11.7	63.6
Jackson	120.6	20.0	4.1	6.9	0.5	0.3	32.7	9.2	46.9
Lawrence	125.3	14.9	2.1	--	0.3	0.6	39.3	12.5	55.6
Monroe	117.5	8.0	8.3	18.9	0.3	0.6	30.6	9.2	41.6
Morgan	86.7	--	--	5.2	0.6	1.1	28.5	8.3	43.0
Orange	129.1	26.0	12.4	1.3	0.4	0.7	31.5	8.9	47.9
Owen	107.5	--	6.2	5.5	0.2	0.4	40.8	11.9	42.5
Perry	152.5	53.9	--	3.4	0.3	2.6	32.6	10.3	49.4
Scott	43.0	--	--	5.3	0.3	--	13.4	4.1	19.9
Spencer	62.5	--	--	--	0.4	0.2	22.4	6.7	32.8
Warrick	81.4	--	--	--	0.5	0.5	30.2	8.9	41.3
Washington	119.6	--	--	12.6	0.3	0.7	45.1	13.6	47.3
All counties	1,741.1	157.0	62.0	129.3	5.9	13.5	514.5	154.6	704.3

Table 8.--Area of timberland by county and forest type, Knobs Unit, Indiana, 1986

(In thousand acres)

County	All types	Forest type													
		Jack-red-white pine	Shortleaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Brown	131.6	2.0	2.3	3.0	4.3	53.9	4.6	0.5	1.6	0.1	13.7	0.1	30.8	14.4	0.3
Clark	84.9	1.7	1.0	2.9	3.3	30.9	1.9	0.7	1.4	0.2	11.2	0.1	19.1	10.0	0.5
Crawford	119.3	4.4	1.7	1.4	3.1	50.2	2.6	0.4	1.7	0.2	12.8	0.2	26.4	13.7	0.5
Dubois	93.0	1.0	0.3	3.5	3.1	34.6	1.8	0.9	1.2	--	10.7	--	25.3	10.2	0.4
Floyd	34.5	0.2	0.1	0.8	1.2	12.7	0.2	0.1	0.3	--	4.1	--	10.7	3.9	0.2
Harrison	132.1	1.9	0.5	4.9	4.7	50.0	3.4	1.0	2.5	0.4	16.9	0.7	28.3	16.3	0.6
Jackson	120.6	2.1	1.4	2.9	2.9	50.3	4.5	1.4	2.2	0.2	14.5	0.8	21.9	14.9	0.6
Lawrence	125.3	1.3	0.3	2.2	3.0	54.4	3.0	1.0	1.2	--	11.6	0.2	32.5	14.1	0.5
Monroe	117.5	1.0	0.6	2.6	2.8	48.4	2.9	0.9	1.5	--	12.8	0.2	30.2	13.2	0.4
Morgan	86.7	1.3	0.2	2.0	2.7	32.8	2.2	0.6	1.7	0.3	12.2	0.2	18.8	10.9	0.8
Orange	129.1	3.3	2.5	1.8	4.1	54.7	2.8	0.7	2.1	0.3	13.5	0.5	25.6	15.7	1.5
Owen	107.5	0.7	0.1	3.0	4.0	38.6	0.9	0.5	1.6	--	14.2	--	31.4	12.1	0.4
Perry	152.5	4.9	7.8	1.9	4.7	70.5	4.3	0.6	1.5	0.2	12.5	0.2	25.7	16.9	0.8
Scott	43.0	0.6	0.2	1.6	1.3	15.7	1.0	0.4	0.7	--	5.8	0.2	9.7	5.4	0.4
Spencer	62.5	0.8	0.1	2.9	1.8	22.4	1.3	0.9	1.2	--	8.5	0.3	13.8	7.8	0.7
Warrick	81.4	1.2	0.5	3.2	2.6	27.1	1.6	1.0	1.9	0.2	13.2	0.7	16.8	10.8	0.6
Washington	119.6	1.4	0.6	5.1	4.6	42.0	0.7	0.8	1.3	--	14.4	--	35.2	13.0	0.5
All counties	1,741.1	29.8	20.2	45.7	54.2	689.2	39.7	12.4	25.6	2.1	202.6	4.4	402.2	203.3	9.7

Table 9.--Area of timberland by county and stand-size class, Knobs Unit, Indiana, 1986

(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling & seedling	Nonstocked
Brown	131.6	93.6	18.6	19.0	0.4
Clark	84.9	56.3	11.9	16.3	0.4
Crawford	119.3	76.2	17.6	24.9	0.6
Dubois	93.0	61.6	11.8	19.1	0.5
Floyd	34.5	24.7	3.8	5.9	0.1
Harrison	132.1	84.7	22.3	24.4	0.7
Jackson	120.6	75.3	21.4	23.2	0.7
Lawrence	125.3	89.4	15.7	19.7	0.5
Monroe	117.5	79.6	18.4	19.2	0.3
Morgan	86.7	54.4	12.3	19.3	0.7
Orange	129.1	86.3	19.2	22.0	1.6
Owen	107.5	71.9	13.4	21.8	0.4
Perry	152.5	101.7	22.9	27.0	0.9
Scott	43.0	27.2	6.4	9.1	0.3
Spencer	62.5	38.5	8.9	14.6	0.5
Warrick	81.4	44.9	14.5	21.3	0.7
Washington	119.6	82.4	14.9	21.9	0.4
All counties	1,741.1	1,148.7	254.0	328.7	9.7

Table 10.--Area of timberland by county and site class, Knobs Unit, Indiana, 1986

(In thousand acres)

County	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	0-49
Brown	131.6	1.8	20.5	16.0	48.1	34.6	10.6
Clark	84.9	1.5	12.9	10.7	29.8	22.0	8.0
Crawford	119.3	4.0	18.5	12.4	40.4	33.4	10.6
Dubois	93.0	0.6	16.0	11.2	35.0	22.1	8.1
Floyd	34.5	0.1	6.6	4.6	14.6	6.1	2.5
Harrison	132.1	1.6	19.0	14.6	49.0	35.3	12.6
Jackson	120.6	2.0	16.9	12.1	43.7	33.9	12.0
Lawrence	125.3	1.2	21.6	13.5	46.3	32.6	10.1
Monroe	117.5	0.5	20.4	12.8	44.1	30.1	9.6
Morgan	86.7	1.1	12.3	8.9	31.1	24.1	9.2
Orange	129.1	3.2	18.1	13.9	45.2	36.0	12.7
Owen	107.5	0.4	19.5	13.3	42.9	21.7	9.7
Perry	152.5	4.9	21.4	20.0	49.3	43.5	13.4
Scott	43.0	0.5	6.5	4.7	15.5	11.4	4.4
Spencer	62.5	0.7	9.0	6.3	22.3	17.2	7.0
Warrick	81.4	1.1	11.7	8.8	29.1	21.1	9.6
Washington	119.6	0.9	22.7	16.3	48.8	21.7	9.2
All counties	1,741.1	26.1	273.6	200.1	635.2	446.8	159.3

Table 11.--Area of timberland by county and stocking class of growing-stock trees, Knobs Unit, Indiana, 1986

(In thousand acres)

County	All classes	Stocking percent of growing-stock trees				
		Less than 16.7	16.7-59.9	60.0-99.9	100.0-129.9	130.0+
Brown	131.6	0.3	6.1	53.4	61.4	10.4
Clark	84.9	0.4	5.7	33.7	37.7	7.4
Crawford	119.3	0.6	6.0	50.2	52.9	9.6
Dubois	93.0	0.5	6.2	37.9	41.5	6.9
Floyd	34.5	0.2	2.9	13.0	16.0	2.4
Harrison	132.1	0.6	8.4	54.6	60.1	8.4
Jackson	120.6	0.7	7.6	50.5	54.6	7.2
Lawrence	125.3	0.5	5.7	52.6	57.2	9.3
Monroe	117.5	0.4	6.5	49.8	53.2	7.6
Morgan	86.7	0.8	6.3	36.2	38.1	5.3
Orange	129.1	1.6	6.5	52.8	59.2	9.0
Owen	107.5	0.3	9.4	40.6	50.1	7.1
Perry	152.5	0.9	6.0	58.3	72.4	14.9
Scott	43.0	0.3	2.9	17.8	19.0	3.0
Spencer	62.5	0.5	4.6	25.7	27.7	4.0
Warrick	81.4	0.7	7.1	33.4	35.0	5.2
Washington	119.6	0.4	10.8	43.5	55.5	9.4
All counties	1,741.1	9.7	108.7	704.0	791.6	127.1

Table 12.--Area of timberland by forest type and ownership class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack-red-white pine	29.8	11.5	--	4.5	--	--	3.6	4.1	6.1
Shortleaf pine	20.2	14.3	--	1.9	--	--	1.9	--	2.1
Scotch-Virginia pine	45.7	--	--	4.0	--	--	20.8	4.0	16.9
Oak-pine	54.2	3.4	2.5	1.9	--	--	25.7	1.9	18.8
Oak-hickory	689.2	95.2	20.1	80.6	3.8	9.7	177.9	50.9	251.0
Chestnut-scarlet oak	39.7	6.2	--	13.9	--	--	--	--	19.6
Sassafras-persimmon	12.4	--	--	--	--	--	1.9	2.1	8.4
Oak-gum	25.6	--	--	2.3	--	--	13.1	2.0	8.2
Lowland oak	2.1	--	--	--	--	--	2.1	--	--
Elm-ash-soft maple	202.6	1.2	10.7	4.2	--	--	66.5	31.7	88.3
Cottonwood	4.4	--	--	--	--	--	--	4.4	--
Maple-beech	402.2	8.5	22.6	10.1	2.1	3.8	127.7	38.7	188.7
Cherry-ash-yellow-poplar	203.3	15.0	6.1	5.9	--	--	73.3	14.8	88.2
Nonstocked	9.7	1.7	--	--	--	--	--	--	8.0
All types	1,741.1	157.0	62.0	129.3	5.9	13.5	514.5	154.6	704.3

Table 13.--Area of timberland by ownership class and site class, Knobs Unit, Indiana, 1986

(In thousand acres)

Ownership class	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	0-49
National forest	157.0	11.9	20.2	19.0	38.3	53.9	13.7
Miscellaneous federal	62.0	--	8.3	8.2	21.1	20.0	4.4
State	129.3	1.9	8.7	10.4	45.3	52.7	10.3
County and municipal	5.9	--	--	--	5.9	--	--
Forest industry	13.5	--	3.8	1.9	1.9	5.9	--
Farmer	514.5	2.1	92.7	58.6	204.5	99.8	56.8
Misc. private-corporation	154.6	4.1	21.0	24.5	55.0	37.8	12.2
Misc. private-individual	704.3	6.1	118.9	77.5	263.2	176.7	61.9
All owners	1,741.1	26.1	273.6	200.1	635.2	446.8	159.3

Table 14.--Area of privately owned timberland by ownership class, owner tenure, and size of holding, Knobs Unit, Indiana, 1986

(In thousand acres)

Ownership class and owner tenure class	All sizes	Size of holding (acres)								
		1-4	5-10	11-20	21-50	51-100	101-500	501-2,500	2,501-5,000	5001+
Forest industry										
1-4 years	7.6	--	--	--	--	--	5.7	--	--	1.9
5-9 years	--	--	--	--	--	--	--	--	--	--
10-19 years	1.9	--	--	--	--	--	--	--	--	1.9
20+ years	4.0	--	--	--	--	--	1.9	--	--	2.1
All classes	13.5	--	--	--	--	--	7.6	--	--	5.9
Farmer										
1-4 years	104.3	16.2	3.8	8.2	21.6	26.2	23.9	4.4	--	--
5-9 years	87.1	8.6	3.6	16.4	10.8	21.3	26.4	--	--	--
10-19 years	133.3	4.0	6.2	15.4	45.0	38.8	23.9	--	--	--
20+ years	189.8	3.8	4.0	22.9	39.4	61.1	56.7	1.9	--	--
All classes	514.5	32.6	17.6	62.9	116.8	147.4	130.9	6.3	--	--
Misc. priv.-corporation										
1-4 years	35.6	--	--	--	4.1	6.5	21.0	4.0	--	--
5-9 years	27.7	3.8	--	--	2.2	2.3	13.6	5.8	--	--
10-19 years	54.0	--	--	1.9	6.1	8.1	10.5	25.7	1.7	--
20+ years	37.3	--	--	--	--	4.0	9.5	19.5	2.2	2.1
All classes	154.6	3.8	--	1.9	12.4	20.9	54.6	55.0	3.9	2.1
Misc. priv.-individual										
1-4 years	181.4	19.0	18.9	16.3	37.7	42.3	41.3	5.9	--	--
5-9 years	151.5	8.3	5.7	18.3	50.0	30.8	38.4	--	--	--
10-19 years	171.7	4.4	4.2	12.2	40.9	49.0	53.0	3.8	4.2	--
20+ years	199.7	1.9	--	16.5	56.4	65.7	53.0	6.2	--	--
All classes	704.3	33.6	28.8	63.3	185.0	187.8	185.7	15.9	4.2	--
All private owners										
1-4 years	328.9	35.2	22.7	24.5	63.4	75.0	91.9	14.3	--	1.9
5-9 years	266.3	20.7	9.3	34.7	63.0	54.4	78.4	5.8	--	--
10-19 years	360.9	8.4	10.4	29.5	92.0	95.9	87.4	29.5	5.9	1.9
20+ years	430.8	5.7	4.0	39.4	95.8	130.8	121.1	27.6	2.2	4.2
All classes	1,386.9	70.0	46.4	128.1	314.2	356.1	378.8	77.2	8.1	8.0

Table 15.--Area of timberland by ownership class and stocking class of growing-stock trees, Knobs Unit, Indiana, 1986

(In thousand acres)

Ownership class	All classes	Stocking percent of growing stock trees				
		Less than 16.7	16.7-59.9	60.0-99.9	100.0-129.9	130.0+
National forest	157.0	1.7	1.0	55.5	77.0	21.8
Miscellaneous federal	62.0	--	2.5	33.7	20.1	5.7
State	129.3	--	--	38.4	80.5	10.4
County and municipal	5.9	--	1.7	--	4.2	--
Forest industry	13.5	--	--	4.0	9.5	--
Farmer	514.5	--	48.8	213.0	221.3	31.4
Misc. private-corporation	154.6	--	18.7	62.1	59.8	14.0
Misc. private-individual	704.3	8.0	36.0	297.3	319.2	43.8
All owners	1,741.1	9.7	108.7	704.0	791.6	127.1

Table 16.--Area of timberland by forest type and stand-size class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling & seedling	Nonstocked
Jack-red-white pine	29.8	8.1	7.6	14.1	--
Shortleaf pine	20.2	7.6	10.8	1.8	--
Scotch-Virginia pine	45.7	14.2	8.2	23.3	--
Oak-pine	54.2	25.3	13.3	15.6	--
Oak-hickory	689.2	502.5	86.8	99.9	--
Chestnut-scarlet oak	39.7	39.7	--	--	--
Sassafras-persimmon	12.4	--	4.2	8.2	--
Oak-gum	25.6	16.7	2.3	6.6	--
Lowland oak	2.1	2.1	--	--	--
Elm-ash-soft maple	202.6	105.1	48.3	49.2	--
Cottonwood	4.4	2.1	2.3	--	--
Maple-beech	402.2	295.9	38.6	67.7	--
Cherry-ash-yellow-poplar	203.3	129.4	31.6	42.3	--
Nonstocked	9.7	--	--	--	9.7
All types	1,741.1	1,148.7	254.0	328.7	9.7

Table 17.--Area of timberland by ownership class and stand-volume class, Knobs Unit, Indiana, 1986

(In thousand acres)

Ownership class	All classes	Stand-volume class (board feet[1/])		
		Less than 1,500	1,500 to 5,000	5,000+
National forest	157.0	33.2	51.9	71.9
Miscellaneous federal	62.0	20.1	14.4	27.5
State	129.3	18.1	31.5	79.7
County and municipal	5.9	--	5.9	--
Forest industry	13.5	--	3.8	9.7
Farmer	514.5	147.4	165.4	201.7
Misc. private-corporation	154.6	52.2	37.7	64.7
Misc. private-individual	704.3	180.0	229.6	294.7
All owners	1,741.1	451.0	540.2	749.9

[1/] International 1/4-inch rule.

Table 18.--Area of timberland by forest type, stand-size class, and ownership class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type and stand-size class	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Jack-red-white pine									
Sawtimber	8.1	4.1	--	1.9	--	--	--	2.1	--
Poletimber	7.6	--	--	--	--	--	3.6	--	4.0
Sapling & seedling	14.1	7.4	--	2.6	--	--	--	2.0	2.1
All stands	29.8	11.5	--	4.5	--	--	3.6	4.1	6.1
Shortleaf pine									
Sawtimber	7.6	1.7	--	1.9	--	--	1.9	--	2.1
Poletimber	10.8	10.8	--	--	--	--	--	--	--
Sapling & seedling	1.8	1.8	--	--	--	--	--	--	--
All stands	20.2	14.3	--	1.9	--	--	1.9	--	2.1
Scotch-Virginia pine									
Sawtimber	14.2	--	--	4.0	--	--	4.1	1.9	4.2
Poletimber	8.2	--	--	--	--	--	4.0	--	4.2
Sapling & seedling	23.3	--	--	--	--	--	12.7	2.1	8.5
All stands	45.7	--	--	4.0	--	--	20.8	4.0	16.9
Oak-pine									
Sawtimber	25.3	3.4	--	1.9	--	--	10.3	1.9	7.8
Poletimber	13.3	--	2.5	--	--	--	6.3	--	4.5
Sapling & seedling	15.6	--	--	--	--	--	9.1	--	6.5
All stands	54.2	3.4	2.5	1.9	--	--	25.7	1.9	18.8
Oak-hickory									
Sawtimber	502.5	68.9	15.5	67.2	3.8	7.8	126.3	40.4	172.6
Poletimber	86.8	17.3	4.6	6.4	--	1.9	22.4	--	34.2
Sapling & seedling	99.9	9.0	--	7.0	--	--	29.2	10.5	44.2
All stands	689.2	95.2	20.1	80.6	3.8	9.7	177.9	50.9	251.0
Chestnut-scarlet oak									
Sawtimber	39.7	6.2	--	13.9	--	--	--	--	19.6
Poletimber	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--
All stands	39.7	6.2	--	13.9	--	--	--	--	19.6
Sassafras-persimmon									
Sawtimber	--	--	--	--	--	--	--	--	--
Poletimber	4.2	--	--	--	--	--	--	--	4.2
Sapling & seedling	8.2	--	--	--	--	--	1.9	2.1	4.2
All stands	12.4	--	--	--	--	--	1.9	2.1	8.4
Oak-gum									
Sawtimber	16.7	--	--	--	--	--	10.6	--	6.1
Poletimber	2.3	--	--	2.3	--	--	--	--	--
Sapling & seedling	6.6	--	--	--	--	--	2.5	2.0	2.1
All stands	25.6	--	--	2.3	--	--	13.1	2.0	8.2

(Table 18 continued on next page)

(Table 18 continued)

Forest type and stand-size class	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Lowland oak									
Sawtimber	2.1	--	--	--	--	--	2.1	--	--
Poletimber	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--
All stands	2.1	--	--	--	--	--	2.1	--	--
Elm-ash-soft maple									
Sawtimber	105.1	0.4	6.4	4.2	--	--	38.9	9.8	45.4
Poletimber	48.3	--	--	--	--	--	15.0	10.5	22.8
Sapling & seedling	49.2	0.8	4.3	--	--	--	12.6	11.4	20.1
All stands	202.6	1.2	10.7	4.2	--	--	66.5	31.7	88.3
Cottonwood									
Sawtimber	2.1	--	--	--	--	--	--	2.1	--
Poletimber	2.3	--	--	--	--	--	--	2.3	--
Sapling & seedling	--	--	--	--	--	--	--	--	--
All stands	4.4	--	--	--	--	--	--	4.4	--
Maple-beech									
Sawtimber	295.9	8.0	13.6	8.2	--	3.8	86.8	29.6	145.9
Poletimber	38.6	--	6.4	1.9	2.1	--	15.0	4.4	8.8
Sapling & seedling	67.7	0.5	2.6	--	--	--	25.9	4.7	34.0
All stands	402.2	8.5	22.6	10.1	2.1	3.8	127.7	38.7	188.7
Cherry-ash-yellow-poplar									
Sawtimber	129.4	5.6	3.8	5.9	--	--	48.7	10.5	54.9
Poletimber	31.6	3.2	2.3	--	--	--	11.1	--	15.0
Sapling & seedling	42.3	6.2	--	--	--	--	13.5	4.3	18.3
All stands	203.3	15.0	6.1	5.9	--	--	73.3	14.8	88.2
Nonstocked	9.7	1.7	--	--	--	--	--	--	8.0
All types									
Sawtimber	1,148.7	98.3	39.3	109.1	3.8	11.6	329.7	98.3	458.6
Poletimber	254.0	31.3	15.8	10.6	2.1	1.9	77.4	17.2	97.7
Sapling & seedling	328.7	25.7	6.9	9.6	--	--	107.4	39.1	140.0
Nonstocked	9.7	1.7	--	--	--	--	--	--	8.0
All stands	1,741.1	157.0	62.0	129.3	5.9	13.5	514.5	154.6	704.3

Table 19.--Area of timberland by forest type, stand-size class, and site class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type and stand-size class	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	0-49
Jack-red-white pine							
Sawtimber	8.1	8.1	--	--	--	--	--
Poletimber	7.6	6.1	1.5	--	--	--	--
Sapling & seedling	14.1	11.5	2.6	--	--	--	--
All stands	29.8	25.7	4.1	--	--	--	--
Shortleaf pine							
Sawtimber	7.6	0.4	--	4.9	2.3	--	--
Poletimber	10.8	--	--	10.8	--	--	--
Sapling & seedling	1.8	--	--	--	--	1.8	--
All stands	20.2	0.4	--	15.7	2.3	1.8	--
Scotch-Virginia pine							
Sawtimber	14.2	--	--	3.8	5.8	4.6	--
Poletimber	8.2	--	1.7	1.9	--	2.3	2.3
Sapling & seedling	23.3	--	1.7	4.6	4.9	8.1	4.0
All stands	45.7	--	3.4	10.3	10.7	15.0	6.3
Oak-pine							
Sawtimber	25.3	--	5.7	1.7	12.2	5.7	--
Poletimber	13.3	--	2.1	--	6.4	4.8	--
Sapling & seedling	15.6	--	--	--	5.0	8.0	2.6
All stands	54.2	--	7.8	1.7	23.6	18.5	2.6
Oak-hickory							
Sawtimber	502.5	--	58.0	28.1	203.9	188.3	24.2
Poletimber	86.8	--	5.7	4.3	32.1	38.5	6.2
Sapling & seedling	99.9	--	8.1	4.4	48.3	32.9	6.2
All stands	689.2	--	71.8	36.8	284.3	259.7	36.6
Chestnut-scarlet oak							
Sawtimber	39.7	--	--	--	9.0	28.6	2.1
Poletimber	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	39.7	--	--	--	9.0	28.6	2.1
Sassafras-persimmon							
Sawtimber	--	--	--	--	--	--	--
Poletimber	4.2	--	4.2	--	--	--	--
Sapling & seedling	8.2	--	--	--	2.1	6.1	--
All stands	12.4	--	4.2	--	2.1	6.1	--
Oak-gum							
Sawtimber	16.7	--	--	--	--	--	16.7
Poletimber	2.3	--	--	--	--	--	2.3
Sapling & seedling	6.6	--	--	--	--	--	6.6
All stands	25.6	--	--	--	--	--	25.6

(Table 19 continued on next page)

(Table 19 continued)

Forest type and stand-size class	All classes	Site class (cubic feet of growth per acre per year)					
		225+	165-224	120-164	85-119	50-84	0-49
Lowland oak							
Sawtimber	2.1	--	--	--	--	--	2.1
Poletimber	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	2.1	--	--	--	--	--	2.1
Elm-ash-soft maple							
Sawtimber	105.1	--	--	32.7	46.5	21.7	4.2
Poletimber	48.3	--	--	22.1	14.7	9.3	2.2
Sapling & seedling	49.2	--	--	8.8	13.3	16.9	10.2
All stands	202.6	--	--	63.6	74.5	47.9	16.6
Cottonwood							
Sawtimber	2.1	--	--	--	2.1	--	--
Poletimber	2.3	--	--	--	--	2.3	--
Sapling & seedling	--	--	--	--	--	--	--
All stands	4.4	--	--	--	2.1	2.3	--
Maple-beech							
Sawtimber	295.9	--	79.8	35.3	118.5	33.9	28.4
Poletimber	38.6	--	4.7	2.6	27.0	2.2	2.1
Sapling & seedling	67.7	--	13.2	2.2	28.4	11.2	12.7
All stands	402.2	--	97.7	40.1	173.9	47.3	43.2
Cherry-ash-yellow-poplar							
Sawtimber	129.4	--	66.6	19.8	30.4	7.9	4.7
Poletimber	31.6	--	8.5	4.0	6.7	5.7	6.7
Sapling & seedling	42.3	--	9.5	8.1	15.6	3.9	5.2
All stands	203.3	--	84.6	31.9	52.7	17.5	16.6
Nonstocked	9.7	--	--	--	--	2.1	7.6
All types							
Sawtimber	1,148.7	8.5	210.1	126.3	430.7	290.7	82.4
Poletimber	254.0	6.1	28.4	45.7	86.9	65.1	21.8
Sapling & seedling	328.7	11.5	35.1	28.1	117.6	88.9	47.5
Nonstocked	9.7	--	--	--	--	2.1	7.6
All stands	1,741.1	26.1	273.6	200.1	635.2	446.8	159.3

Table 20.--Area of timberland by forest type and stand-age class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	All ages	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack-red-white pine	29.8	11.5	2.6	11.7	4.0	--	--	--	--	--	--	--	--	--
Shortleaf pine	20.2	1.8	--	--	13.3	2.8	2.3	--	--	--	--	--	--	--
Scotch-Virginia pine	45.7	8.3	14.9	4.1	10.2	6.3	--	1.9	--	--	--	--	--	--
Oak-pine	54.2	7.6	8.0	6.4	4.0	16.6	5.9	1.9	3.8	--	--	--	--	--
Oak-hickory	689.2	47.6	52.3	16.0	36.2	66.7	102.0	95.6	82.9	94.2	42.1	44.2	7.3	2.1
Chestnut-scarlet oak	39.7	--	--	--	--	--	1.9	6.9	3.8	11.3	8.0	1.9	5.9	--
Sassafras-persimmon	12.4	8.2	1.9	--	--	--	2.3	--	--	--	--	--	--	--
Oak-gum	25.6	2.1	4.5	--	2.3	4.2	4.1	4.0	--	1.9	--	2.5	--	--
Lowland oak	2.1	--	--	--	--	--	--	2.1	--	--	--	--	--	--
Elm-ash-soft maple	202.6	30.6	25.2	19.2	29.1	27.5	21.4	24.6	14.7	6.5	1.7	2.1	--	--
Cottonwood	4.4	--	2.3	--	--	--	--	2.1	--	--	--	--	--	--
Maple-beech	402.2	32.7	39.1	8.7	38.8	26.8	79.6	49.3	46.0	45.3	18.0	17.9	--	--
Cherry-ash-yellow-poplar	203.3	19.3	23.0	21.0	37.8	49.5	23.8	13.9	9.3	3.8	1.9	--	--	--
Nonstocked	9.7	9.7	--	--	--	--	--	--	--	--	--	--	--	--
All types	1,741.1	179.4	173.8	87.1	175.7	200.4	243.3	202.3	160.5	163.0	71.7	68.6	13.2	2.1

Table 21.--Area of timberland by forest type and site-index class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	All classes	Site-index class (feet)								
		11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
Jack-red-white pine	29.8	--	--	--	--	--	--	--	--	29.8
Shortleaf pine	20.2	--	--	--	--	1.8	0.4	4.0	13.6	0.4
Scotch-Virginia pine	45.7	--	--	4.3	--	2.0	10.4	7.2	14.6	7.2
Oak-pine	54.2	--	--	2.6	--	--	7.6	24.0	8.3	11.7
Oak-hickory	689.2	--	--	--	22.1	73.9	157.1	190.7	173.1	72.3
Chestnut-scarlet oak	39.7	--	--	--	2.1	4.0	13.7	19.9	--	--
Sassafras-persimmon	12.4	--	--	--	--	--	2.1	4.0	2.1	4.2
Oak-gum	25.6	--	--	--	--	--	8.8	6.8	1.9	8.1
Lowland oak	2.1	--	--	--	--	2.1	--	--	--	--
Elm-ash-soft maple	202.6	--	--	--	6.4	4.5	15.6	40.5	43.3	92.3
Cottonwood	4.4	--	--	--	--	--	2.3	--	2.1	--
Maple-beech	402.2	--	--	--	4.0	12.1	30.9	74.6	113.8	166.8
Cherry-ash-yellow-poplar	203.3	--	--	--	--	4.2	18.4	19.4	36.5	124.8
Nonstocked	9.7	--	--	3.8	--	2.1	3.8	--	--	--
All types	1,741.1	--	--	10.7	34.6	106.7	271.1	391.1	409.3	517.6

Table 22.--Area of timberland by forest type, stand-size class, and basal-area class, Indiana, 1986

(In thousand acres)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack-red-white pine															
Sawtimber	8.1	--	--	--	--	--	--	--	--	4.1	--	1.9	--	2.1	--
Poletimber	7.6	--	--	--	--	--	--	--	--	--	--	5.5	2.1	--	--
Sapling & seedling	14.1	--	11.5	--	--	--	--	2.6	--	--	--	--	--	--	--
All stands	29.8	--	11.5	--	--	--	--	2.6	--	4.1	--	7.4	2.1	2.1	--
Shortleaf pine															
Sawtimber	7.6	--	--	--	--	--	--	--	0.5	2.3	--	2.9	1.9	--	--
Poletimber	10.8	--	--	--	--	--	--	--	--	--	--	10.8	--	--	--
Sapling & seedling	1.8	--	--	--	--	1.8	--	--	--	--	--	--	--	--	--
All stands	20.2	--	--	--	--	1.8	--	--	0.5	2.3	--	13.7	1.9	--	--
Scotch-Virginia pine															
Sawtimber	14.2	--	--	--	--	--	--	--	--	4.9	--	5.7	3.6	--	--
Poletimber	8.2	--	--	--	--	2.3	--	--	2.3	1.7	1.9	--	--	--	--
Sapling & seedling	23.3	--	4.6	1.8	--	--	3.8	4.6	2.3	--	--	--	--	--	6.2
All stands	45.7	--	4.6	1.8	--	2.3	3.8	4.6	4.6	6.6	1.9	5.7	3.6	--	6.2
Oak-pine															
Sawtimber	25.3	--	--	--	--	1.9	--	2.2	--	5.5	1.9	10.2	3.6	--	--
Poletimber	13.3	--	--	--	--	--	--	2.2	4.6	2.1	--	4.4	--	--	--
Sapling & seedling	15.6	--	1.8	--	--	2.6	4.4	4.3	2.5	--	--	--	--	--	--
All stands	54.2	--	1.8	--	--	4.5	4.4	8.7	7.1	7.6	1.9	14.6	3.6	--	--
Oak-hickory															
Sawtimber	502.5	--	--	--	2.2	11.8	22.4	17.5	52.0	113.3	81.7	153.0	42.5	4.2	1.9
Poletimber	86.8	--	--	--	--	--	14.9	18.3	27.5	8.3	7.7	8.0	2.1	--	--
Sapling & seedling	99.9	4.4	12.3	10.6	5.1	6.4	33.7	16.9	4.1	4.3	--	--	--	--	2.1
All stands	689.2	4.4	12.3	10.6	7.3	18.2	71.0	52.7	83.6	125.9	89.4	161.0	44.6	4.2	4.0
Chestnut-scarlet oak															
Sawtimber	39.7	--	--	--	--	--	2.1	2.1	--	10.9	7.3	13.5	3.8	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	39.7	--	--	--	--	--	2.1	2.1	--	10.9	7.3	13.5	3.8	--	--
Sassafras-persimmon															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	4.2	--	--	--	--	--	--	--	1.9	--	--	2.3	--	--	--
Sapling & seedling	8.2	2.1	2.1	--	--	1.9	--	--	--	--	--	--	--	--	2.1
All stands	12.4	2.1	2.1	--	--	1.9	--	--	1.9	--	--	2.3	--	--	2.1
Oak-gum															
Sawtimber	16.7	--	--	--	2.2	--	--	--	--	--	5.9	6.7	1.9	--	--
Poletimber	2.3	--	--	--	--	--	--	--	--	--	--	2.3	--	--	--
Sapling & seedling	6.6	--	2.0	--	2.5	--	2.1	--	--	--	--	--	--	--	--
All stands	25.6	--	2.0	--	4.7	--	2.1	--	--	--	5.9	9.0	1.9	--	--

(Table 22 continued on next page)

(Table 22 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Lowland oak															
Sawtimber	2.1	--	--	--	--	--	--	--	--	2.1	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	2.1	--	--	--	--	--	--	--	--	2.1	--	--	--	--	--
Elm-ash-soft maple															
Sawtimber	105.1	--	--	1.9	2.5	8.6	2.3	8.7	16.2	12.7	18.0	18.4	12.0	3.8	--
Poletimber	48.3	--	--	--	2.6	6.7	4.5	6.1	12.3	7.8	--	8.3	--	--	--
Sapling & seedling	49.2	0.2	2.6	2.3	13.1	14.0	4.4	3.9	6.8	--	--	--	--	--	1.9
All stands	202.6	0.2	2.6	4.2	18.2	29.3	11.2	18.7	35.3	20.5	18.0	26.7	12.0	3.8	1.9
Cottonwood															
Sawtimber	2.1	--	--	--	--	--	--	--	2.1	--	--	--	--	--	--
Poletimber	2.3	--	--	--	--	--	2.3	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	4.4	--	--	--	--	--	2.3	--	2.1	--	--	--	--	--	--
Maple-beech															
Sawtimber	295.9	--	--	2.1	2.2	12.2	36.5	23.3	53.1	45.2	38.9	64.4	18.0	--	--
Poletimber	38.6	--	--	--	--	2.1	6.6	6.2	10.5	1.9	2.3	9.0	--	--	--
Sapling & seedling	67.7	0.1	3.9	4.5	9.1	15.2	8.8	13.2	10.7	--	2.1	--	--	--	0.1
All stands	402.2	0.1	3.9	6.6	11.3	29.5	51.9	42.7	74.3	47.1	43.3	73.4	18.0	--	0.1
Cherry-ash-yellow-poplar															
Sawtimber	129.4	--	--	--	--	2.1	5.7	8.2	10.7	23.1	10.8	43.8	22.2	0.9	1.9
Poletimber	31.6	--	--	--	--	--	2.5	--	9.2	6.6	--	8.0	5.3	--	--
Sapling & seedling	42.3	2.1	4.0	4.8	5.8	9.9	2.6	2.2	5.8	3.1	--	--	--	--	2.0
All stands	203.3	2.1	4.0	4.8	5.8	12.0	10.8	10.4	25.7	32.8	10.8	51.8	27.5	0.9	3.9
Nonstocked	9.7	2.1	1.7	3.8	--	--	--	--	--	--	--	--	--	--	2.1
All types															
Sawtimber	1,148.7	--	--	4.0	9.1	36.6	69.0	62.0	134.6	224.1	164.5	320.5	109.5	11.0	3.8
Poletimber	254.0	--	--	--	2.6	11.1	30.8	32.8	68.3	28.4	11.9	58.6	9.5	--	--
Sapling & seedling	328.7	8.9	44.8	24.0	35.6	51.8	59.8	47.7	32.2	7.4	2.1	--	--	--	14.4
Nonstocked	9.7	2.1	1.7	3.8	--	--	--	--	--	--	--	--	--	--	2.1
All stands	1,741.1	11.0	46.5	31.8	47.3	99.5	159.6	142.5	235.1	259.9	178.5	379.1	119.0	11.0	20.3

Table 23.--Area of timberland by stocking class based on selected stand components, Knobs Unit, Indiana, 1986

(In thousand acres)

Stocking class (percent)	Stocking classified in terms of:		
	All live trees	Growing-stock trees	Rough and rotten trees
0-10	2.1	5.9	767.9
11-20	3.6	3.9	562.2
21-30	4.3	9.0	248.9
31-40	1.8	16.5	99.6
41-50	21.3	35.6	46.1
51-60	21.9	47.5	10.5
61-70	24.6	72.7	5.9
71-80	51.7	147.2	--
81-90	106.5	200.2	--
91-100	158.6	283.9	--
101-110	269.6	290.5	--
111-120	375.6	319.1	--
121-130	356.7	182.0	--
131-140	242.9	95.1	--
141-150	69.8	25.5	--
151-160	27.8	6.5	--
161+	0.1	--	--
All classes	1,741.1	1,741.1	1,741.1

Table 24.--Area of timberland in plantations by forest type and stand-age class, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	All ages	Stand-age class (years)						
		1-10	11-20	21-30	31-40	41-50	50-60	61-70
Jack-red-white pine	23.7	11.5	2.6	7.5	2.1	--	--	--
Shortleaf pine	17.0	1.8	--	--	12.9	0.4	1.9	--
Scotch-Virginia pine	21.9	--	5.7	2.3	5.7	6.3	--	1.9
All types	62.6	13.3	8.3	9.8	20.7	6.7	1.9	1.9

Table 25.--Area of reserved timberland by ownership class, Knobs Unit, Indiana, 1986

(In thousand acres)

Ownership class	Area
National forest	12.4
Miscellaneous federal	--
State	47.4
County and municipal	2.1
Forest industry	--
Farmer	--
Misc. private-corp.	2.3
Misc. private-indiv.	--
All owners	64.2

Table 26.--Area of reserved timberland by forest type, Knobs Unit, Indiana, 1986

(In thousand acres)

Forest type	Area
Jack-red-white pine	--
Shortleaf pine	--
Scotch-Virginia pine	--
Oak-pine	--
Oak-hickory	45.5
Chestnut-scarlet oak	--
Sassafras-persimmon	4.4
Oak-gum	--
Elm-ash-soft maple	4.1
Cottonwood	--
Maple-beech	10.2
Cherry-ash-yellow-poplar	--
Nonstocked	--
All types	64.2

Table 27.--Area of nonforest land with trees by land use and forest type, Knobs Unit, Indiana, 1986

(In thousand acres)

Land use	All types	Forest type													
		Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft-maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Cropland	19.6	--	--	--	--	11.5	--	--	--	--	4.3	--	--	3.8	--
Improved pasture	52.2	--	--	--	3.9	24.2	--	1.9	--	2.1	1.8	--	2.1	3.9	12.3
Wooded strips	28.0	--	--	--	--	7.8	--	--	--	--	13.9	--	6.3	--	--
Idle farmland	13.8	--	--	--	--	5.9	--	--	--	--	5.8	--	--	--	2.1
Marsh	1.9	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9
Windbreaks	15.2	--	--	--	--	4.0	--	3.6	--	--	5.7	--	1.9	--	--
Wooded pasture	35.0	--	--	1.8	2.0	3.5	--	--	--	--	1.7	--	6.2	11.8	8.0
Urban forestland	16.2	--	--	--	--	12.0	--	--	--	--	2.0	--	2.2	--	--
Urban and other	61.4	--	--	--	--	32.1	--	--	--	--	1.3	--	23.9	4.1	--
All uses	243.3	--	--	1.8	5.9	101.0	--	5.5	--	2.1	36.5	--	42.6	23.6	24.3

Table 28.--Number of all live trees on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods															
Jack pine	713	192	69	99	202	96	33	6	10	3	3	--	--	--	--
Red pine	254	--	--	224	--	30	--	--	--	--	--	--	--	--	--
White pine	10,110	4,269	3,495	652	777	496	254	133	34	--	--	--	--	--	--
Shortleaf pine	3,472	126	180	833	1,368	716	182	58	9	--	--	--	--	--	--
Other yellow pines	11,786	4,890	2,154	1,888	845	931	557	413	90	4	4	6	4	--	--
Baldcypress	18	--	--	--	--	18	--	--	--	--	--	--	--	--	--
Eastern redcedar	38,387	25,425	7,128	2,931	1,576	767	291	178	78	11	--	--	2	--	--
Other softwoods	836	75	207	346	208	--	--	--	--	--	--	--	--	--	--
Total	65,576	34,977	13,233	6,973	4,976	3,054	1,317	788	221	18	7	6	6	--	--
Hardwoods															
Select white oak	30,988	7,308	4,569	2,559	3,717	3,405	2,764	2,405	1,761	1,144	593	371	316	71	5
Other white oak	10,366	2,265	1,365	910	1,122	944	1,196	1,058	817	426	155	69	39	--	--
Select red oak	10,445	2,442	1,689	1,278	1,201	849	611	888	495	331	297	170	133	61	--
Other red oak	26,098	9,483	3,228	2,195	1,890	2,315	1,947	1,499	1,496	876	586	271	275	35	2
Select hickory	17,467	5,238	3,843	2,232	1,777	1,672	1,155	723	463	213	90	43	18	--	--
Other hickory	22,558	6,792	4,578	2,691	2,979	2,105	1,541	891	504	255	136	43	39	4	--
Basswood	1,231	744	57	27	122	54	47	78	43	28	5	14	10	2	--
Beech	25,977	16,581	3,495	1,476	969	727	607	430	385	403	278	210	307	102	7
Hard maple	134,622	86,109	21,876	11,019	6,091	3,630	2,472	1,510	1,010	385	253	149	92	22	4
Soft maple	40,747	25,518	7,260	3,332	2,022	906	510	408	329	241	93	54	66	6	2
Elm	53,315	38,652	7,653	3,752	1,435	944	396	223	125	67	36	18	10	4	--
Ash	35,252	18,198	5,553	4,445	2,234	2,136	1,018	778	431	242	97	62	45	13	--
Sycamore	6,824	1,830	873	1,020	679	756	446	392	234	193	153	84	122	38	4
Cottonwood	1,073	216	267	50	107	90	149	59	17	25	27	8	33	23	2
Willow	2,132	1,569	369	137	--	38	14	--	--	--	3	--	2	--	--
Hackberry	7,146	3,906	1,419	658	419	324	199	65	68	41	26	9	12	--	--
Aspen	3,226	1,122	630	503	282	263	129	127	127	26	10	6	--	--	1
Birch	2,401	1,440	486	153	86	122	10	55	28	17	4	--	--	--	--
Sweetgum	7,887	3,534	1,779	636	536	466	398	277	120	79	26	12	6	15	3
Tupelo	17,025	11,877	2,646	818	590	453	289	171	76	43	21	16	22	3	--
Black cherry	14,282	7,791	2,682	1,533	924	413	417	173	191	81	35	28	9	5	--
Black walnut	5,495	1,494	753	740	893	560	432	313	188	65	29	11	13	1	3
Butternut	142	51	--	--	43	--	20	12	16	--	--	--	--	--	--
Yellow-poplar	32,566	14,973	4,386	2,825	2,482	1,798	1,581	1,697	1,088	819	470	218	187	37	5
Persimmon	8,335	4,140	2,214	1,190	429	258	66	28	6	4	--	--	--	--	--
Sassafras	72,038	40,926	17,331	8,029	3,343	1,292	633	251	117	81	14	3	18	--	--
Other hardwoods	129,954	104,295	19,503	4,357	774	420	312	122	78	51	14	17	10	1	--
Noncommercial spp.	68,402	56,586	9,300	2,153	312	13	32	--	--	4	--	--	2	--	--
Total	787,994	475,080	129,804	60,718	37,458	26,953	19,391	14,633	10,213	6,140	3,451	1,886	1,786	443	38
All species	853,570	510,057	143,037	67,691	42,434	30,007	20,708	15,421	10,434	6,158	3,458	1,892	1,792	443	38

Table 29.--Number of growing stock trees on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods															
Jack pine	713	192	69	99	202	96	33	6	10	3	3	--	--	--	--
Red pine	254	--	--	224	--	30	--	--	--	--	--	--	--	--	--
White pine	10,053	4,212	3,495	652	777	496	254	133	34	--	--	--	--	--	--
Shortleaf pine	3,389	126	180	833	1,368	633	182	58	9	--	--	--	--	--	--
Other yellow pines	11,717	4,890	2,088	1,888	845	931	557	413	90	4	4	3	4	--	--
Baldcypress	18	--	--	--	--	18	--	--	--	--	--	--	--	--	--
Eastern redcedar	37,069	25,017	7,062	2,778	1,336	490	243	112	24	5	--	--	2	--	--
Other softwoods	836	75	207	346	208	--	--	--	--	--	--	--	--	--	--
Total	64,049	34,512	13,101	6,820	4,736	2,694	1,269	722	167	12	7	3	6	--	--
Hardwoods															
Select white oak	30,146	7,308	4,512	2,516	3,569	3,334	2,594	2,265	1,741	1,083	564	353	258	48	1
Other white oak	9,853	2,265	1,365	866	1,022	907	1,074	966	764	384	143	63	34	--	--
Select red oak	10,033	2,442	1,626	1,221	1,181	786	593	810	472	300	267	164	123	48	--
Other red oak	25,208	9,483	3,228	2,081	1,719	2,215	1,831	1,404	1,380	837	513	251	236	30	--
Select hickory	16,808	5,238	3,660	2,169	1,670	1,587	1,090	657	417	197	74	38	11	--	--
Other hickory	21,978	6,729	4,521	2,622	2,912	2,006	1,460	801	476	251	125	40	31	4	--
Basswood	1,066	687	57	--	53	54	47	78	38	23	5	14	8	2	--
Beech	23,534	16,083	3,162	1,234	710	599	475	299	300	247	187	121	105	12	--
Hard maple	131,267	85,407	21,426	10,525	5,794	3,309	2,169	1,206	828	278	188	92	32	11	2
Soft maple	39,249	25,305	6,819	3,176	1,871	777	380	340	239	184	66	48	41	3	--
Elm	51,596	38,061	7,464	3,227	1,293	895	268	186	114	44	25	12	5	2	--
Ash	34,012	18,090	5,289	4,178	2,093	1,933	917	731	369	226	94	52	35	5	--
Sycamore	6,563	1,830	873	1,020	601	742	431	352	201	182	128	76	99	24	4
Cottonwood	1,012	216	267	50	86	90	125	59	12	25	20	8	33	19	2
Willow	2,116	1,569	369	137	--	38	--	--	--	--	3	--	--	--	--
Hackberry	6,573	3,570	1,362	562	391	306	178	65	58	41	23	9	8	--	--
Aspen	3,112	1,122	630	446	282	206	129	127	127	26	10	6	--	--	1
Birch	2,386	1,440	486	153	86	107	10	55	28	17	4	--	--	--	--
Sweetgum	7,748	3,534	1,722	636	506	455	388	267	109	71	26	12	6	13	3
Tupelo	16,849	11,877	2,646	818	544	391	279	147	52	39	21	16	16	3	--
Black cherry	13,213	7,791	2,355	1,220	714	364	378	126	140	63	31	22	9	--	--
Black walnut	4,762	1,494	696	604	674	396	385	258	168	56	21	8	2	--	--
Butternut	125	51	--	--	43	--	10	12	9	--	--	--	--	--	--
Yellow-poplar	32,031	14,916	4,308	2,825	2,418	1,772	1,458	1,635	1,088	764	446	216	171	14	--
Persimmon	7,761	4,077	1,989	1,050	377	180	56	28	--	4	--	--	--	--	--
Sassafras	65,739	39,774	15,048	6,363	2,793	1,061	409	172	58	52	4	--	5	--	--
Other hardwoods	122,125	102,264	16,542	2,511	352	199	161	39	22	15	6	13	--	1	--
Noncommercial spp.	2,310	2,124	186	--	--	--	--	--	--	--	--	--	--	--	--
Total	689,175	414,747	112,608	52,210	33,754	24,709	17,295	13,085	9,210	5,409	2,994	1,634	1,268	239	13
All species	753,224	449,259	125,709	59,030	38,490	27,403	18,564	13,807	9,377	5,421	3,001	1,637	1,274	239	13

Table 30.--Net volume of growing stock and sawtimber on timberland by species group, Knobs Unit, 1967 and 1986

Species group	Growing stock		Sawtimber	
	1967	1986	1967	1986
	Thousand cubic feet		Thousand board feet[1/]	
Softwoods				
Jack pine	--	3,468	--	11,740
Red pine	--	700	--	1,419
White pine	1,491	18,152	--	67,842
Shortleaf pine	21,688	25,187	41,648	68,730
Other yellow pines	20,518	38,552	46,947	166,036
Baldcypress	--	285	--	1,470
Eastern redcedar	14,566	34,862	30,097	85,749
Other softwoods	1,135	2,511	--	--
Total	59,398	123,717	118,692	402,986
Hardwoods				
Select white oak	333,476	358,681	1,180,493	1,513,684
Other white oak	126,111	116,406	459,481	504,344
Select red oak	118,597	121,917	471,247	528,072
Other red oak	242,402	255,746	967,537	1,114,880
Select hickory	100,800	103,846	287,096	365,595
Other hickory	139,477	139,132	400,892	473,390
Basswood	12,190	8,699	48,518	39,506
Beech	65,605	81,949	259,037	344,282
Hard maple	146,325	228,579	381,566	652,881
Soft maple	18,139	73,880	49,258	214,027
Elm	37,155	41,783	86,282	87,445
Ash	63,490	106,924	161,265	335,958
Sycamore	58,889	86,365	214,360	353,628
Cottonwood	5,980	15,762	25,013	70,251
Willow	2,638	925	6,203	875
Hackberry	5,604	16,890	20,279	54,805
Aspen	9,770	17,254	24,180	60,134
Birch	5,709	5,584	21,722	17,010
Sweetgum	16,065	33,470	50,106	124,250
Tupelo	18,615	24,078	63,255	81,172
Black cherry	21,733	35,326	69,470	121,534
Black walnut	27,212	32,050	82,768	111,301
Butternut	2,866	1,005	7,967	4,008
Yellow-poplar	90,634	236,003	341,026	998,660
Persimmon	3,314	7,544	1,154	7,502
Sassafras	20,660	53,507	23,070	76,266
Other hardwoods	10,678	14,722	27,712	30,399
Total	1,704,134	2,218,027	5,730,957	8,285,859
All species	1,763,532	2,341,744	5,849,649	8,688,845

[1/] International 1/4-inch rule.

Table 31.--Net volume of all live trees[1/] on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods													
Jack pine	3,468	205	1,095	919	519	125	302	150	153	--	--	--	--
Red pine	700	425	--	275	--	--	--	--	--	--	--	--	--
White pine	18,152	1,577	4,074	4,433	3,830	3,039	1,199	--	--	--	--	--	--
Shortleaf pine	25,738	2,822	9,433	8,185	3,330	1,635	333	--	--	--	--	--	--
Other yellow pines	38,684	4,037	4,098	8,998	8,505	9,021	2,892	188	219	332	394	--	--
Baldcypress	285	--	--	285	--	--	--	--	--	--	--	--	--
Eastern redcedar	40,371	9,206	10,776	7,864	5,352	4,279	2,158	483	--	--	253	--	--
Other softwoods	2,511	1,196	1,315	--	--	--	--	--	--	--	--	--	--
Total	129,909	19,468	30,791	30,959	21,536	18,099	6,884	821	372	332	647	--	--
Hardwoods													
Select white oak	373,248	7,251	21,852	34,594	44,531	57,040	58,102	50,662	33,654	26,089	29,049	9,845	579
Other white oak	122,202	2,617	6,437	9,776	18,456	23,993	26,031	18,289	8,451	4,748	3,404	--	--
Select red oak	128,259	3,490	7,227	8,176	9,938	20,104	15,691	14,114	16,222	11,607	12,565	9,125	--
Other red oak	269,543	5,640	10,671	23,197	31,005	34,102	47,016	37,048	31,486	18,510	25,534	5,060	274
Select hickory	109,579	5,993	9,806	17,705	20,038	18,434	16,736	10,531	5,527	3,267	1,542	--	--
Other hickory	144,246	6,885	17,107	23,435	26,869	22,123	18,341	12,544	8,595	3,520	3,981	846	--
Basswood	9,350	76	581	619	740	2,101	1,463	1,179	330	1,108	863	290	--
Beech	117,830	4,301	5,312	7,298	9,622	9,658	12,171	15,404	13,642	11,550	19,687	8,538	647
Hard maple	258,027	30,899	36,091	37,957	39,913	34,185	31,755	15,341	13,114	8,891	6,541	2,716	624
Soft maple	85,697	11,027	13,280	9,630	7,999	9,269	10,152	9,731	4,733	3,543	5,171	946	216
Elm	46,956	9,221	7,818	9,179	5,561	5,043	3,958	2,446	1,699	979	709	343	--
Ash	114,076	11,773	11,947	19,654	15,574	17,598	13,345	10,072	5,220	3,799	3,921	1,173	--
Sycamore	93,299	3,202	4,409	9,516	8,950	10,403	8,799	10,136	10,115	7,071	13,481	6,305	912
Cottonwood	16,870	116	706	979	2,605	1,617	571	1,306	1,494	714	3,183	3,191	388
Willow	1,236	272	--	484	189	--	--	--	169	--	122	--	--
Hackberry	18,094	1,501	2,013	3,049	2,994	1,566	2,060	1,827	1,347	586	1,151	--	--
Aspen	17,515	1,765	1,701	2,327	2,289	3,316	4,079	1,041	481	383	--	--	133
Birch	5,649	425	554	1,385	171	1,358	859	716	181	--	--	--	--
Sweetgum	34,423	1,528	2,939	4,786	6,746	6,371	4,104	3,212	1,474	876	446	1,675	266
Tupelo	25,965	1,828	2,700	4,132	4,646	3,714	2,264	1,821	1,270	1,169	2,072	349	--
Black cherry	40,386	3,534	5,264	4,474	7,014	4,242	6,611	3,569	2,343	1,933	1,166	236	--
Black walnut	37,641	1,974	5,104	5,499	6,889	7,034	5,934	2,490	1,314	530	675	78	120
Butternut	1,239	--	222	--	314	275	428	--	--	--	--	--	--
Yellow-poplar	243,517	7,930	14,848	18,745	25,479	40,136	37,009	35,484	25,995	15,367	18,315	3,916	293
Persimmon	8,549	2,706	1,977	2,161	868	546	136	155	--	--	--	--	--
Sassafras	65,252	17,190	15,509	11,402	8,242	5,041	3,024	3,021	549	120	1,154	--	--
Other hardwoods	25,779	7,951	3,106	3,345	3,883	2,071	1,597	1,484	665	976	473	228	--
Noncommercial spp.	4,987	3,468	1,027	80	266	--	--	81	--	--	65	--	--
Total	2,419,414	154,563	210,208	273,584	311,791	341,340	332,236	263,704	190,070	127,336	155,270	54,860	4,452
All species	2,549,323	174,031	240,999	304,543	333,327	359,439	339,120	264,525	190,442	127,668	155,917	54,860	4,452

[1/] Net volume of all live trees 5 inches dbh and larger from a 1-foot stump to a 4-inch top diameter outside bark.

Table 32.--Net volume of timber on timberland by class of timber and species group, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Class of timber	All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Live trees					
Growing-stock trees					
Sawtimber					
Saw log portion	1,332,587	53,878	14,891	351,411	912,407
Upper stem portion	364,484	4,415	1,262	100,390	258,417
Total	1,697,071	58,293	16,153	451,801	1,170,824
Poletimber	644,673	30,277	18,994	199,205	396,197
All growing-stock trees	2,341,744	88,570	35,147	651,006	1,567,021
Cull trees					
Short-log trees	45,088	158	735	14,691	29,504
Rough trees					
Sawtimber	67,494	525	3,786	17,682	45,501
Poletimber	35,779	--	945	12,495	22,339
Total	103,273	525	4,731	30,177	67,840
Rotten trees					
Sawtimber	51,056	--	--	12,048	39,008
Poletimber	8,162	--	43	3,288	4,831
Total	59,218	--	43	15,336	43,839
All cull trees	207,579	683	5,509	60,204	141,183
All live trees	2,549,323	89,253	40,656	711,210	1,708,204
Salvable dead trees					
Sawtimber	26,256	1,036	826	5,985	18,409
Poletimber	15,744	1,105	747	4,932	8,960
Total	42,000	2,141	1,573	10,917	27,369
All classes	2,591,323	91,394	42,229	722,127	1,735,573

Table 33.--Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods											
Jack pine	1,987	810	494	119	285	141	138	--	--	--	--
Red pine	243	243	--	--	--	--	--	--	--	--	--
White pine	11,598	3,917	3,649	2,894	1,138	--	--	--	--	--	--
Shortleaf pine	11,793	6,747	3,173	1,558	315	--	--	--	--	--	--
Other yellow pines	28,257	7,951	8,106	8,595	2,744	177	197	176	311	--	--
Baldcypress	252	252	--	--	--	--	--	--	--	--	--
Eastern redcedar	14,639	5,538	4,603	3,070	929	299	--	--	200	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	68,769	25,458	20,025	16,236	5,411	617	335	176	511	--	--
Hardwoods											
Select white oak	230,806	--	32,021	43,480	46,160	39,401	25,537	19,450	18,958	5,652	147
Other white oak	77,083	--	12,956	18,074	19,929	13,926	6,343	3,525	2,330	--	--
Select red oak	80,356	--	7,323	14,953	12,214	10,684	11,893	8,726	8,886	5,677	--
Other red oak	169,855	--	22,323	25,949	35,939	29,000	22,649	13,491	17,062	3,442	--
Select hickory	55,899	--	14,508	13,757	12,570	8,073	3,859	2,328	804	--	--
Other hickory	72,325	--	19,459	16,373	14,267	10,021	6,446	2,589	2,547	623	--
Basswood	6,030	--	554	1,660	1,104	849	258	853	538	214	--
Beech	52,349	--	6,026	5,717	8,140	9,012	8,379	6,417	7,320	1,338	--
Hard maple	99,740	--	27,217	23,027	22,292	9,827	8,313	5,087	2,390	1,263	324
Soft maple	32,645	--	4,780	6,426	6,361	6,349	2,955	2,492	2,841	441	--
Elm	13,373	--	3,228	3,569	2,994	1,483	1,037	583	311	168	--
Ash	51,324	--	10,886	13,385	9,587	7,824	3,987	2,688	2,483	484	--
Sycamore	53,769	--	6,598	7,774	6,427	7,956	7,084	5,199	8,708	3,411	612
Cottonwood	10,663	--	1,750	1,278	364	1,052	898	550	2,341	2,144	286
Willow	132	--	--	--	--	--	132	--	--	--	--
Hackberry	8,360	--	2,089	1,238	1,464	1,469	999	450	651	--	--
Aspen	9,204	--	1,713	2,619	3,267	837	376	294	--	--	98
Birch	2,607	--	128	1,075	688	575	141	--	--	--	--
Sweetgum	18,980	--	4,956	4,976	3,062	2,463	1,151	674	328	1,175	195
Tupelo	12,383	--	3,394	2,639	1,529	1,396	991	898	1,279	257	--
Black cherry	18,548	--	4,909	2,816	4,425	2,484	1,754	1,302	858	--	--
Black walnut	17,035	--	4,766	4,878	4,352	1,796	803	324	116	--	--
Butternut	614	--	140	217	257	--	--	--	--	--	--
Yellow-poplar	152,275	--	18,059	31,018	29,621	27,312	19,765	11,774	12,959	1,767	--
Persimmon	1,150	--	593	432	--	125	--	--	--	--	--
Sassafras	11,677	--	4,697	3,168	1,569	1,847	132	--	264	--	--
Other hardwoods	4,636	--	1,890	724	433	522	264	635	--	168	--
Total	1,263,818	--	216,963	251,222	249,015	196,283	136,146	90,329	93,974	28,224	1,662
All species	1,332,587	25,458	236,988	267,458	254,426	196,900	136,481	90,505	94,485	28,224	1,662

Table 34.--Net volume of growing stock, sawtimber, short-log, and rough and rotten trees on timberland by individual species (commercial species only), Knobs Unit, Indiana, 1986

Species	All live trees					Saw-log size trees		
	Total all live	Growing stock	Short-log cull	Rough cull	Rotten cull	Total saw log	Sawtimber	Short-log
	Thousand cubic feet					Thousand board feet[1]		
Jack pine	3,468	3,468	--	--	--	11,740	11,740	--
Red pine	700	700	--	--	--	1,419	1,419	--
White pine	18,152	18,152	--	--	--	67,842	67,842	--
Shortleaf pine	25,738	25,187	26	525	--	68,859	68,730	129
Virginia pine	38,684	38,552	132	--	--	166,398	166,036	362
Baldcypress	285	285	--	--	--	1,470	1,470	--
Eastern redcedar	40,371	34,862	735	4,731	43	89,240	85,749	3,491
Scotch pine	2,511	2,511	--	--	--	--	--	--
White oak	351,611	338,192	5,067	6,380	1,972	1,440,091	1,424,611	15,480
Swamp white oak	4,082	4,082	--	--	--	19,702	19,702	--
Bur oak	418	232	--	186	--	1,131	1,131	--
Swamp chestnut	2,243	2,068	175	--	--	9,512	9,049	463
Chinkapin oak	14,894	14,107	--	787	--	59,191	59,191	--
Overcup oak	391	391	--	--	--	2,059	2,059	--
Chestnut oak	111,356	106,569	1,646	1,828	1,313	475,725	470,325	5,400
Post oak	10,455	9,446	99	753	157	32,327	31,960	367
Cherrybark oak	2,833	2,576	147	110	--	12,647	12,134	513
Northern red oak	125,426	119,341	1,710	2,835	1,540	520,899	515,938	4,961
Scarlet oak	35,729	33,797	659	898	375	142,247	140,308	1,939
Northern pin oak	3,587	3,587	--	--	--	15,840	15,840	--
Southern red oak	175	175	--	--	--	858	858	--
Shingle oak	5,649	4,345	124	1,180	--	12,045	11,661	384
Blackjack oak	102	102	--	--	--	--	--	--
Pin oak	12,176	10,461	431	996	288	50,732	49,369	1,363
Black oak	212,125	203,279	3,189	3,786	1,871	906,491	896,844	9,647
Pecan	1,798	1,608	190	--	--	7,824	7,284	540
Shellbark hickory	4,617	4,059	134	424	--	13,778	13,334	444
Shagbark hickory	77,989	74,423	1,089	2,359	118	267,999	264,543	3,456
Mockernut hickory	25,175	23,756	332	1,020	67	81,617	80,434	1,183
Bitternut hickory	31,082	30,182	340	352	208	107,616	106,517	1,099
Pignut hickory	113,164	108,950	1,480	2,099	635	371,795	366,873	4,922
American basswood	9,225	8,574	125	442	84	39,894	39,506	388
White basswood	125	125	--	--	--	--	--	--
Beech	117,830	81,949	4,541	8,930	22,410	358,051	344,282	13,769
Black maple	191	191	--	--	--	982	982	--
Sugar maple	257,836	228,388	5,474	16,341	7,633	669,568	651,899	17,669
Red maple	58,899	50,550	2,127	4,740	1,482	141,860	134,914	6,946
Silver maple	26,798	23,330	1,052	1,886	530	82,598	79,113	3,485
Winged elm	1,353	1,353	--	--	--	945	945	-
American elm	22,781	19,125	1,275	2,224	157	40,646	36,469	4,177
Siberian elm	122	122	--	--	--	--	--	--
Slippery elm	22,413	20,896	297	914	306	51,134	50,031	1,103
Rock elm	287	287	--	--	--	--	--	--
Black ash	504	504	--	--	--	1,558	1,558	--
Blue ash	2,424	1,876	--	416	132	799	799	--
White ash	93,113	87,688	958	3,515	952	278,385	275,388	2,997
Green ash	18,035	16,856	216	442	521	58,990	58,213	777
Sycamore	93,299	86,365	1,847	2,956	2,131	359,370	353,628	5,742
Eastern cottonwood	16,870	15,762	283	548	277	71,193	70,251	942
Black willow	1,236	925	--	311	--	875	875	--
Hackberry	18,094	16,890	380	639	185	56,009	54,805	1,204
Balsam poplar	133	133	--	--	--	649	649	--
Bigtooth aspen	16,532	16,271	--	84	177	55,035	55,035	--
Quaking aspen	850	850	--	--	--	4,450	4,450	--
River birch	5,649	5,584	--	--	65	17,010	17,010	--
Sweetgum	34,423	33,470	225	427	301	124,944	124,250	694
Black tupelo	25,965	24,078	459	814	614	82,692	81,172	1,520
Swamp tupelo	967	856	--	--	111	4,433	4,433	--
Black cherry	40,386	35,326	1,749	2,632	679	127,221	121,534	5,687
Black walnut	37,641	32,050	1,051	3,791	749	114,631	111,301	3,330
Butternut	1,239	1,005	127	--	107	4,481	4,008	473
Yellow-poplar	243,517	236,003	2,279	2,327	2,908	1,006,306	998,660	7,646
Boxelder	6,984	3,314	541	1,582	1,547	10,165	8,335	1,830
Ohio buckeye	1,322	1,322	--	--	--	2,965	2,965	--
Northern catalpa	1,035	350	233	452	--	1,584	801	783
Persimmon	8,549	7,544	--	671	334	7,502	7,502	--
Kentucky coffeetree	1,042	560	332	--	150	4,065	2,906	1,159
Flowering dogwood	4,330	2,680	--	1,527	123	--	--	--
Honeylocust	1,437	1,019	--	332	86	1,112	1,112	--
White mulberry	85	--	--	85	--	--	--	--
Red mulberry	80	--	--	80	--	--	--	--
Black locust	7,776	4,621	120	895	2,140	10,265	9,847	418
Sassafras	65,252	53,507	1,692	6,313	3,740	81,583	76,266	5,317
European alder	721	--	--	721	--	--	--	--
All commercial species	2,544,336	2,341,744	45,088	98,286	59,218	8,833,044	8,688,845	144,199

[1] International 1/4-inch rule.

Table 35.--Net volume of noncommercial species on timberland by individual species, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species	Cull volume
American hornbeam	845
Osage-orange	954
Apple	290
Eastern hophornbeam	626
Wild plum	101
Eastern redbud	2,036
Pawpaw	135
All species	4,987

Table 36.--Net volume of growing stock on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods													
Jack pine	3,468	205	1,095	919	519	125	302	150	153	--	--	--	--
Red pine	700	425	--	275	--	--	--	--	--	--	--	--	--
White pine	18,152	1,577	4,074	4,433	3,830	3,039	1,199	--	--	--	--	--	--
Shortleaf pine	25,187	2,822	9,433	7,634	3,330	1,635	333	--	--	--	--	--	--
Other yellow pines	38,552	4,037	4,098	8,998	8,505	9,021	2,892	188	219	200	394	--	--
Baldcypress	285	--	--	285	--	--	--	--	--	--	--	--	--
Eastern redcedar	34,862	8,906	10,088	6,268	4,830	3,221	978	318	--	--	253	--	--
Other softwoods	2,511	1,196	1,315	--	--	--	--	--	--	--	--	--	--
Total	123,717	19,168	30,103	28,812	21,014	17,041	5,704	656	372	200	647	--	--
Hardwoods													
Select white oak	358,681	7,162	21,294	34,217	42,737	55,006	57,663	48,977	32,699	25,282	25,765	7,679	200
Other white oak	116,406	2,541	6,082	9,548	17,286	22,867	24,898	17,313	8,121	4,584	3,166	--	--
Select red oak	121,917	3,397	7,146	7,764	9,776	18,923	15,264	13,272	15,235	11,351	12,074	7,715	--
Other red oak	255,746	5,406	9,957	22,377	29,799	32,823	44,900	36,052	29,017	17,547	23,190	4,678	--
Select hickory	103,846	5,817	9,439	17,026	19,360	17,405	15,706	10,034	4,939	3,029	1,091	--	--
Other hickory	139,132	6,695	16,815	22,731	25,961	20,715	17,829	12,458	8,258	3,366	3,458	846	--
Basswood	8,699	--	348	619	740	2,101	1,379	1,054	330	1,108	730	290	--
Beech	81,949	3,868	4,271	6,320	8,045	7,231	10,174	11,197	10,736	8,342	9,947	1,818	--
Hard maple	228,579	29,895	34,865	35,619	36,328	29,131	27,857	12,223	10,645	6,611	3,251	1,714	440
Soft maple	73,880	10,699	12,736	8,605	6,380	8,128	7,949	7,894	3,786	3,241	3,862	600	--
Elm	41,783	8,436	7,311	8,899	4,309	4,509	3,740	1,842	1,329	756	423	229	--
Ash	106,924	11,299	11,446	18,376	14,535	16,938	11,977	9,721	5,108	3,494	3,373	657	--
Sycamore	86,365	3,202	4,025	9,442	8,805	9,834	8,036	9,888	9,074	6,758	11,834	4,635	832
Cottonwood	15,762	116	605	979	2,335	1,617	455	1,306	1,150	714	3,183	2,914	388
Willow	925	272	--	484	--	--	--	--	169	--	--	--	--
Hackberry	16,890	1,300	1,905	2,929	2,786	1,566	1,827	1,827	1,280	586	884	--	--
Aspen	17,254	1,681	1,701	2,150	2,289	3,316	4,079	1,041	481	383	--	--	133
Birch	5,584	425	554	1,320	171	1,358	859	716	181	--	--	--	-
Sweetgum	33,470	1,528	2,776	4,710	6,614	6,293	3,825	3,065	1,474	876	446	1,597	266
Tupelo	24,078	1,828	2,523	3,693	4,528	3,338	1,909	1,735	1,270	1,169	1,736	349	--
Black cherry	35,326	2,931	4,441	4,125	6,551	3,562	5,527	3,085	2,246	1,692	1,166	--	--
Black walnut	32,050	1,757	4,199	4,276	6,364	6,176	5,438	2,232	1,028	422	158	--	--
Butternut	1,005	--	222	--	187	275	321	--	--	--	--	--	--
Yellow-poplar	236,003	7,930	14,582	18,558	24,102	39,250	37,009	33,936	25,315	15,311	17,609	2,401	--
Persimmon	7,544	2,503	1,836	1,712	792	546	--	155	--	--	--	--	--
Sassafras	53,507	14,601	13,775	10,077	6,268	4,003	1,959	2,296	169	--	359	--	--
Other hardwoods	14,722	5,008	1,745	1,950	2,523	915	540	649	338	826	--	228	--
Total	2,218,027	140,297	196,599	258,506	289,571	317,826	311,120	243,968	174,378	117,448	127,705	38,350	2,259
All species	2,341,744	159,465	226,702	287,318	310,585	334,867	316,824	244,624	174,750	117,648	128,352	38,350	2,259

Table 37.--Net volume of sawtimber on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods											
Jack pine	11,740	4,741	2,835	704	1,722	871	867	--	--	--	--
Red pine	1,419	1,419	--	--	--	--	--	--	--	--	--
White pine	67,842	22,871	20,938	17,171	6,862	--	--	--	--	--	--
Shortleaf pine	68,730	39,380	18,207	9,240	1,903	--	--	--	--	--	--
Other yellow pines	166,036	46,424	46,506	50,977	16,548	1,093	1,238	1,136	2,114	--	--
Baldcypress	1,470	1,470	--	--	--	--	--	--	--	--	--
Eastern redcedar	85,749	32,329	26,411	18,206	5,601	1,844	--	--	1,358	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	402,986	148,634	114,897	96,298	32,636	3,808	2,105	1,136	3,472	--	--
Hardwoods											
Select white oak	1,513,684	--	209,673	282,201	301,148	258,153	169,280	129,171	125,623	37,458	977
Other white oak	504,344	--	84,842	117,309	130,059	91,233	42,044	23,411	15,446	--	--
Select red oak	528,072	--	47,959	97,066	79,719	69,986	78,850	57,976	58,894	37,622	--
Other red oak	1,114,880	--	146,211	168,424	234,535	190,013	150,181	89,624	113,089	22,803	--
Select hickory	365,595	--	95,013	89,286	82,035	52,892	25,572	15,472	5,325	--	--
Other hickory	473,390	--	127,407	106,267	93,124	65,656	42,739	17,201	16,868	4,128	--
Basswood	39,506	--	3,630	10,768	7,200	5,559	1,708	5,662	3,562	1,417	--
Beech	344,282	--	39,470	37,109	53,127	59,028	55,562	42,618	48,500	8,868	--
Hard maple	652,881	--	178,255	149,450	145,506	64,409	55,123	33,776	15,850	8,366	2,146
Soft maple	214,027	--	31,302	41,711	41,510	41,598	19,595	16,551	18,841	2,919	--
Elm	87,445	--	21,138	23,144	19,532	9,714	6,877	3,864	2,060	1,116	--
Ash	335,958	--	71,311	86,904	62,555	51,247	26,431	17,855	16,449	3,206	--
Sycamore	353,628	--	43,193	50,468	41,973	52,116	46,974	34,534	57,707	22,605	4,058
Cottonwood	70,251	--	11,454	8,303	2,377	6,889	5,953	3,650	15,523	14,212	1,890
Willow	875	--	--	--	--	--	875	--	--	--	--
Hackberry	54,805	--	13,676	8,029	9,543	9,631	6,623	2,991	4,312	--	--
Aspen	60,134	--	11,226	17,013	21,319	5,483	2,490	1,954	--	--	649
Birch	17,010	--	840	6,977	4,487	3,772	934	--	--	--	--
Sweetgum	124,250	--	32,456	32,298	19,982	16,142	7,633	4,476	2,176	7,789	1,298
Tupelo	81,172	--	22,214	17,132	9,968	9,150	6,570	5,969	8,468	1,701	--
Black cherry	121,534	--	32,152	18,282	28,871	16,267	11,623	8,647	5,692	--	--
Black walnut	111,301	--	31,223	31,670	28,397	11,762	5,324	2,157	768	--	--
Butternut	4,008	--	917	1,412	1,679	--	--	--	--	--	--
Yellow-poplar	998,660	--	118,259	201,342	193,325	178,909	131,017	78,213	85,887	11,708	--
Persimmon	7,502	--	3,881	2,802	--	819	--	--	--	--	--
Sassafras	76,266	--	30,759	20,551	10,229	12,103	875	--	1,749	--	--
Other hardwoods	30,399	--	12,374	4,694	2,824	3,423	1,750	4,222	--	1,112	--
Total	8,285,859	--	1,420,835	1,630,612	1,625,024	1,285,954	902,603	599,994	622,789	187,030	11,018
All species	8,688,845	148,634	1,535,732	1,726,910	1,657,660	1,289,762	904,708	601,130	626,261	187,030	11,018

[1/] International 1/4-inch rule.

Table 38.--Net volume of live trees and growing stock on timberland by ownership class and species group, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Ownership class	Live trees					Growing stock				
	All species	Pine	Other softwoods	Soft hardwoods[1]	Hard hardwoods[2]	All species	Pine	Other softwoods	Soft hardwoods[1]	Hard hardwoods[2]
National forest	238,956	18,955	4,168	42,861	172,972	224,516	18,404	3,418	39,246	163,448
Miscellaneous federal	91,411	--	479	28,521	62,411	83,129	--	479	25,375	57,275
State	219,919	12,344	1,209	27,655	178,711	208,812	12,344	988	26,051	169,429
County and municipal	7,643	--	--	3,024	4,619	6,877	--	--	2,917	3,960
Forest industry	26,195	--	--	3,925	22,270	23,979	--	--	3,651	20,328
Farmer	730,469	22,720	17,482	225,399	464,868	663,536	22,720	14,970	203,148	422,698
Misc. private-corp.	207,109	9,495	2,029	71,335	124,250	188,382	9,495	1,893	65,021	111,973
Misc. private-indiv.	1,027,621	25,739	15,289	312,523	674,070	942,513	25,607	13,399	285,597	617,910
All owners	2,549,323	89,253	40,656	715,243	1,704,171	2,341,744	88,570	35,147	651,006	1,567,021

[1] Hardwood species with an average specific gravity of 0.50 or less such as gums, yellow-poplar, cottonwood, red maple, basswood, aspen and willow.

[2] Hardwood species with an average specific gravity of greater than 0.50 such as oaks, hard maple, hickories, and green and white ash.

Table 39.--Net volume of growing stock on timberland by species group and forest type, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All types	Forest type													
		Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods															
Jack pine	3,468	2,197	--	--	104	--	--	--	--	--	--	--	--	1,167	--
Red pine	700	193	--	--	--	275	--	--	232	--	--	--	--	--	--
White pine	18,152	12,197	--	665	2,553	1,851	--	--	--	--	281	--	9	596	--
Shortleaf pine	25,187	3,689	18,879	--	--	2,180	--	--	--	--	36	--	--	403	--
Other yellow pines	38,552	827	1,060	19,033	9,804	2,824	--	460	--	--	1,437	387	2,720	--	--
Baldcypress	285	--	--	--	--	--	--	--	--	--	285	--	--	--	--
Eastern redcedar	34,862	--	226	3,532	16,846	6,652	--	--	--	--	1,172	--	3,178	3,256	--
Other softwoods	2,511	--	--	1,233	--	--	--	--	292	--	--	--	160	826	--
Total	123,717	19,103	20,165	24,463	29,307	13,782	--	460	524	--	3,211	387	6,067	6,248	--
Hardwoods															
Select white oak	358,681	--	--	1,255	3,610	273,107	10,101	461	1,836	--	10,018	--	44,726	13,567	--
Other white oak	116,406	--	146	--	1,884	57,770	46,530	137	391	--	198	--	7,856	1,494	--
Select red oak	121,917	125	1,026	190	1,692	72,035	1,457	--	561	--	2,416	--	30,112	12,303	--
Other red oak	255,746	--	278	2,800	7,903	192,306	8,652	401	2,277	1,234	8,437	--	19,843	11,615	--
Select hickory	103,846	473	1,317	219	2,853	60,295	936	--	1,098	258	6,439	--	23,596	6,362	--
Other hickory	139,132	688	157	--	2,116	93,002	2,259	--	--	--	3,260	--	26,541	11,109	--
Basswood	8,699	--	--	--	--	1,257	238	--	--	--	9	--	7,195	--	--
Beech	81,949	--	51	--	--	16,455	--	--	302	--	750	--	61,170	3,221	--
Hard maple	228,579	--	1,000	355	2,118	52,505	2,123	755	422	--	7,989	--	141,560	19,752	--
Soft maple	73,880	96	239	366	--	7,445	460	--	4,374	548	36,806	670	18,535	4,341	--
Elm	41,783	468	26	130	549	9,914	--	--	580	--	11,174	--	12,511	6,431	--
Ash	106,924	497	1,317	141	2,349	28,803	--	--	2,390	--	21,923	--	21,146	28,358	--
Sycamore	86,365	1,206	365	616	534	11,949	--	--	1,571	--	38,338	328	16,221	15,237	--
Cottonwood	15,762	1,407	--	--	--	225	--	--	--	--	10,843	2,608	417	262	--
Willow	925	--	--	--	--	--	--	--	--	--	509	--	313	--	103
Hackberry	16,890	--	--	--	97	2,166	--	--	--	--	7,982	--	2,954	3,691	--
Aspen	17,254	--	--	--	--	9,862	--	--	--	--	568	--	3,175	3,649	--
Birch	5,584	--	--	--	--	--	--	--	383	--	4,944	--	--	257	--
Sweetgum	33,470	137	--	--	185	3,765	--	--	12,019	585	10,614	--	1,563	4,602	--
Tupelo	24,078	--	84	397	805	8,347	333	--	1,132	65	4,760	--	6,002	2,153	--
Black cherry	35,326	1,239	729	345	466	5,908	--	--	--	--	3,483	--	14,040	9,036	80
Black walnut	32,050	--	--	--	682	6,230	--	--	396	--	6,329	--	8,230	10,183	--
Butternut	1,005	--	--	--	--	--	--	--	--	--	--	--	1,005	--	--
Yellow-poplar	236,003	1,163	3,973	979	2,358	45,374	--	1,131	3,789	--	25,585	110	48,367	103,174	--
Persimmon	7,544	--	--	403	288	2,790	--	186	130	--	836	--	2,596	315	--
Sassafras	53,507	--	1,678	273	875	14,411	--	2,124	1,418	--	6,116	--	17,432	9,180	--
Other hardwoods	14,722	--	--	170	--	2,640	--	--	--	--	5,682	338	4,037	1,855	--
Total	2,218,027	7,499	12,386	8,639	31,364	978,561	73,089	5,195	35,069	2,690	236,008	4,054	541,143	282,147	183
All species	2,341,744	26,602	32,551	33,102	60,671	992,343	73,089	5,655	35,593	2,690	239,219	4,441	547,210	288,395	183

Table 40.--Net volume of sawtimber on timberland by species group and forest type, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Species group	All types	Forest type						
		Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-Persimmon
Softwoods								
Jack pine	11,740	6,163	--	--	539	--	--	--
Red pine	1,419	--	--	--	--	1,419	--	--
White pine	67,842	42,459	--	579	12,536	9,876	--	--
Shortleaf pine	68,730	11,983	50,173	--	--	4,875	--	--
Other yellow pines	166,036	2,974	5,710	76,692	49,128	11,725	--	2,622
Baldcypress	1,470	--	--	--	--	--	--	--
Eastern redcedar	85,749	--	--	8,175	51,342	15,063	--	--
Other softwoods	--	--	--	--	--	--	--	--
Total	402,986	63,579	55,883	85,446	113,545	42,958	--	2,622
Hardwoods								
Select white oak	1,513,684	--	--	6,513	15,462	1123,751	44,318	1,594
Other white oak	504,344	--	751	--	4,390	241,310	210,426	--
Select red oak	528,072	--	5,408	971	7,212	306,681	6,926	--
Other red oak	1,114,880	--	789	14,355	33,849	830,853	35,797	1,480
Select hickory	365,595	1,103	6,566	1,075	12,956	205,838	3,299	--
Other hickory	473,390	2,076	675	--	5,489	304,927	7,467	--
Basswood	39,506	--	--	--	--	4,605	1,241	--
Beech	344,282	--	270	--	--	59,062	--	--
Hard maple	652,881	--	915	1,297	4,038	122,135	3,337	3,010
Soft maple	214,027	--	--	885	--	12,643	838	--
Elm	87,445	--	--	--	--	17,749	--	--
Ash	335,958	1,796	2,276	--	6,195	86,412	--	--
Sycamore	353,628	1,175	1,668	2,202	1,031	35,291	--	--
Cottonwood	70,251	5,160	--	--	--	1,153	--	--
Willow	875	--	--	--	--	--	--	--
Hackberry	54,805	--	--	--	--	7,343	--	--
Aspen	60,134	--	--	--	--	35,043	--	--
Birch	17,010	--	--	--	--	--	--	--
Sweetgum	124,250	--	--	--	948	16,202	--	--
Tupelo	81,172	--	436	--	709	23,473	1,673	--
Black cherry	121,534	--	--	--	--	23,779	--	--
Black walnut	111,301	--	--	--	819	24,599	--	--
Butternut	4,008	--	--	--	--	--	--	--
Yellow-poplar	998,660	2,683	16,644	4,978	9,231	186,433	--	5,871
Persimmon	7,502	--	--	--	--	1,426	--	--
Sassafras	76,266	--	--	835	643	16,522	--	1,492
Other hardwoods	30,399	--	--	--	--	8,479	--	--
Total	8,285,859	13,993	36,398	33,111	102,972	3,695,709	315,322	13,447
All species	8,688,845	77,572	92,281	118,557	216,517	3,738,667	315,322	16,069

(Table 40 continued on next page)

[1/] International 1/4-inch rule.

(Table 40 continued)

Species group	Forest type						
	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods							
Jack pine	--	--	--	--	--	5,038	--
Red pine	--	--	--	--	--	--	--
White pine	--	--	1,039	--	--	1,353	--
Shortleaf pine	--	--	--	--	--	1,699	--
Other yellow pines	--	--	3,029	--	14,156	--	--
Baldcypress	--	--	1,470	--	--	--	--
Eastern redcedar	--	--	--	--	5,434	5,735	--
Other softwoods	--	--	--	--	--	--	--
Total	--	--	5,538	--	19,590	13,825	--
Hardwoods							
Select white oak	9,279	--	46,608	--	207,954	58,205	--
Other white oak	2,059	--	1,010	--	38,262	6,136	--
Select red oak	2,902	--	9,718	--	138,766	49,488	--
Other red oak	11,594	5,780	37,744	--	91,588	51,051	--
Select hickory	4,032	--	18,063	--	96,013	16,650	--
Other hickory	--	--	11,406	--	103,166	38,184	--
Basswood	--	--	--	--	33,660	--	--
Beech	990	--	1,868	--	270,522	11,570	--
Hard maple	903	--	19,988	--	456,257	41,001	--
Soft maple	12,273	2,791	121,759	3,532	46,585	12,721	--
Elm	1,668	--	21,742	--	37,563	8,723	--
Ash	12,121	--	72,979	--	74,283	79,896	--
Sycamore	6,199	--	161,427	--	76,873	67,762	--
Cottonwood	--	--	51,516	9,057	2,086	1,279	--
Willow	--	--	875	--	--	--	--
Hackberry	--	--	24,063	--	11,875	11,524	--
Aspen	--	--	649	--	9,411	15,031	--
Birch	943	--	15,258	--	--	809	--
Sweetgum	48,376	2,945	37,811	--	2,663	15,305	--
Tupelo	2,215	--	21,885	--	22,596	8,185	--
Black cherry	--	--	8,362	--	56,789	32,604	--
Black walnut	2,067	--	21,318	--	27,581	34,917	--
Butternut	--	--	--	--	4,008	--	--
Yellow-poplar	19,820	--	115,432	--	202,653	434,915	--
Persimmon	--	--	--	--	4,459	1,617	--
Sassafras	--	--	11,328	--	37,553	7,893	--
Other hardwoods	--	--	8,221	1,750	8,418	3,531	--
Total	137,441	11,516	841,030	14,339	2,061,584	1,008,997	--
All species	137,441	11,516	846,568	14,339	2,081,174	1,022,822	--

Table 41.--Net volume of growing stock on timberland by species group and ownership class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Softwoods									
Jack pine	3,468	--	--	1,167	--	--	2,197	--	104
Red pine	700	--	--	232	--	--	--	--	468
White pine	18,152	2,049	--	4,355	--	--	4,831	4,504	2,413
Shortleaf pine	25,187	16,355	--	--	--	--	3,678	168	4,986
Other yellow pines	38,552	--	--	6,138	--	--	9,955	4,823	17,636
Baldcypress	285	--	--	--	--	--	--	285	--
Eastern redcedar	34,862	3,418	479	988	--	--	14,970	1,608	13,399
Other softwoods	2,511	--	--	452	--	--	2,059	--	--
Total	123,717	21,822	479	13,332	--	--	37,690	11,388	39,006
Hardwoods									
Select white oak	358,681	50,480	10,345	56,928	1,938	5,964	89,314	23,228	120,484
Other white oak	116,406	19,312	2,365	29,731	1,502	798	11,239	5,310	46,149
Select red oak	121,917	11,422	4,624	11,459	--	2,190	29,857	10,556	51,809
Other red oak	255,746	28,303	9,640	38,987	--	1,394	65,772	13,462	98,188
Select hickory	103,846	8,814	5,844	3,693	--	1,343	33,267	8,653	42,232
Other hickory	139,132	15,522	4,461	6,932	370	2,406	45,391	7,572	56,478
Basswood	8,699	142	1,201	967	--	--	1,139	711	4,539
Beech	81,949	4,033	2,688	3,249	--	2,787	23,729	9,046	36,417
Hard maple	228,579	14,433	12,058	8,679	--	3,100	70,504	21,744	98,061
Soft maple	73,880	2,552	5,713	1,432	--	--	30,770	5,902	27,511
Elm	41,783	1,118	256	2,626	--	745	13,592	7,196	16,250
Ash	106,924	9,770	3,672	7,235	--	--	32,696	8,472	45,079
Sycamore	86,365	5,781	3,230	1,341	--	--	28,496	9,257	38,260
Cottonwood	15,762	--	860	--	--	--	4,442	6,506	3,954
Willow	925	--	--	--	313	--	74	171	367
Hackberry	16,890	--	329	430	208	--	7,985	929	7,009
Aspen	17,254	2,496	2,665	153	--	--	1,802	3,187	6,951
Birch	5,584	55	317	--	--	--	2,692	158	2,362
Sweetgum	33,470	1,108	--	1,192	--	--	9,890	750	20,530
Tupelo	24,078	2,699	364	1,063	--	340	9,034	1,514	9,064
Black cherry	35,326	2,002	1,692	2,389	1,613	--	11,559	3,351	12,720
Black walnut	32,050	475	1,261	1,450	150	346	13,444	1,981	12,943
Butternut	1,005	--	--	--	783	--	222	--	--
Yellow-poplar	236,003	16,821	7,470	10,754	--	921	72,318	19,775	107,944
Persimmon	7,544	112	--	700	--	--	2,903	853	2,976
Sassfras	53,507	4,370	743	3,704	--	1,645	10,164	5,010	27,871
Other hardwoods	14,722	874	852	386	--	--	3,551	1,700	7,359
Total	2,218,027	202,694	82,650	195,480	6,877	23,979	625,846	176,994	903,507
All species	2,341,744	224,516	83,129	208,812	6,877	23,979	663,536	188,382	942,513

Table 42.--Net volume of sawtimber on timberland by species group and ownership class, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Species group	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Softwoods									
Jack pine	11,740	--	--	5,038	--	--	6,163	--	539
Red pine	1,419	--	--	--	--	--	--	--	1,419
White pine	67,842	7,729	--	18,080	--	--	17,756	18,104	6,173
Shortleaf pine	68,730	42,714	--	--	--	--	11,684	--	14,332
Other yellow pines	166,036	--	--	25,739	--	--	42,894	14,834	82,569
Baldcypress	1,470	--	--	--	--	--	--	1,470	--
Eastern redcedar	85,749	11,072	1,019	5,403	--	--	26,754	7,713	33,788
Other softwoods	--	--	--	--	--	--	--	--	--
Total	402,986	61,515	1,019	54,260	--	--	105,251	42,121	138,820
Hardwoods									
Select white oak	1,513,684	204,876	48,576	231,497	9,973	23,830	383,933	100,892	510,107
Other white oak	504,344	83,313	11,324	128,435	6,981	2,279	48,128	23,943	199,941
Select red oak	528,072	47,215	13,091	49,752	--	9,787	132,356	47,891	227,980
Other red oak	1,114,880	114,586	40,815	173,963	--	6,509	295,974	61,082	421,951
Select hickory	365,595	33,892	20,264	9,677	--	4,663	116,551	33,744	146,804
Other hickory	473,390	42,098	8,885	23,840	676	11,723	159,577	26,147	200,444
Basswood	39,506	--	6,248	4,120	--	--	5,224	1,773	22,141
Beech	344,282	12,122	7,940	15,750	--	14,463	94,450	41,792	157,765
Hard maple	652,881	37,152	38,765	12,606	--	12,381	205,709	68,058	278,210
Soft maple	214,027	4,227	17,085	838	--	--	88,795	14,464	88,618
Elm	87,445	718	--	7,235	--	821	27,143	17,285	34,243
Ash	335,958	18,139	9,375	23,464	--	--	110,833	23,077	151,070
Sycamore	353,628	7,845	13,969	6,393	--	--	125,434	27,987	172,000
Cottonwood	70,251	--	4,195	--	--	--	22,475	24,641	18,940
Willow	875	--	--	--	--	--	--	--	875
Hackberry	54,805	--	1,670	855	1,067	--	24,849	3,529	22,835
Aspen	60,134	8,509	12,676	--	--	--	6,282	11,369	21,298
Birch	17,010	124	903	--	--	--	8,715	--	7,268
Sweetgum	124,250	4,846	--	3,662	--	--	38,694	1,782	75,266
Tupelo	81,172	8,275	--	3,150	--	1,449	28,210	6,164	33,924
Black cherry	121,534	4,945	5,032	8,101	1,844	--	44,371	13,163	44,078
Black walnut	111,301	2,460	5,109	5,026	782	876	49,209	7,848	39,991
Butternut	4,008	--	--	--	4,008	--	--	--	--
Yellow-poplar	998,660	72,531	31,748	40,998	--	3,544	303,505	77,365	468,969
Persimmon	7,502	--	--	--	--	--	1,617	2,275	3,610
Sassafras	76,266	1,925	1,708	1,263	--	3,083	14,829	12,454	41,004
Other hardwoods	30,399	4,080	3,071	835	--	--	8,372	2,762	11,279
Total	8,285,859	713,878	302,449	751,460	25,331	95,408	2,345,235	651,487	3,400,611
All species	8,688,845	775,393	303,468	805,720	25,331	95,408	2,450,486	693,608	3,539,431

[1/] International 1/4-inch rule.

Table 43.--Net volume of growing stock on timberland by forest type and stand-age class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Forest type	All ages	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack-red-white pine	26,602	--	380	16,472	9,750	--	--	--	--	--	--	--	--	--
Shortleaf pine	32,551	744	--	--	24,561	4,865	2,381	--	--	--	--	--	--	--
Scotch-Virginia pine	33,102	555	4,992	1,566	13,159	9,080	--	3,750	--	--	--	--	--	--
Oak-pine	60,671	3,067	3,949	6,127	5,203	23,869	9,891	2,828	5,737	--	--	--	--	--
Oak-hickory	992,343	19,305	27,479	17,151	44,160	95,179	157,208	167,782	135,235	163,537	74,817	76,550	12,201	1,739
Chestnut-scarlet oak	73,089	--	--	--	--	--	4,059	13,715	9,379	19,205	14,064	2,781	9,886	--
Sassafras-persimmon	5,655	1,459	1,881	--	--	--	2,315	--	--	--	--	--	--	--
Oak-gum	35,593	--	746	--	2,376	12,817	6,289	6,974	--	2,823	--	3,568	--	--
Lowland oak	2,690	--	--	--	--	--	--	2,690	--	--	--	--	--	--
Elm-ash-soft maple	239,219	12,344	17,085	20,694	35,641	40,528	37,378	40,380	25,374	8,198	846	751	--	--
Cottonwood	4,441	--	1,568	--	--	--	--	2,873	--	--	--	--	--	--
Maple-beech	547,210	20,420	20,145	9,984	56,104	37,188	116,711	84,027	76,489	70,140	29,509	26,493	--	--
Cherry-ash-yellow-poplar	288,395	9,158	9,499	24,862	59,797	92,344	43,120	18,293	17,886	8,079	5,357	--	--	--
Nonstocked	183	183	--	--	--	--	--	--	--	--	--	--	--	--
All types	2,341,744	67,235	87,724	96,856	250,751	315,870	379,352	343,312	270,100	271,982	124,593	110,143	22,087	1,739

Table 44.--Net volume of sawtimber on timberland by forest type and stand-age class, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Forest type	All ages	Stand-age class (years)								
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Jack-red-white pine	77,572	--	--	43,542	34,030	--	--	--	--	--
Shortleaf pine	92,281	1,897	--	--	61,965	17,635	10,784	--	--	--
Scotch-Virginia pine	118,557	--	10,900	1,656	45,797	43,500	--	16,704	--	--
Oak-pine	216,517	8,283	14,973	10,180	15,898	95,286	41,561	15,044	15,292	--
Oak-hickory	3,738,667	62,080	74,908	39,952	132,672	338,263	538,643	640,013	547,781	671,456
Chestnut-scarlet oak	315,322	--	--	--	--	--	17,314	58,968	40,987	83,534
Sassafras-persimmon	16,069	5,696	2,485	--	--	--	7,888	--	--	--
Oak-gum	137,441	--	3,839	--	3,662	49,111	30,056	27,542	--	10,712
Lowland oak	11,516	--	--	--	--	--	--	11,516	--	--
Elm-ash-soft maple	846,568	29,605	49,836	41,582	117,446	142,462	151,224	170,024	98,288	39,750
Cottonwood	14,339	--	801	--	--	--	--	13,538	--	--
Maple-beech	2,081,174	46,629	52,877	15,040	173,689	144,470	466,332	346,026	316,092	284,759
Cherry-ash-yellow-poplar	1,022,822	30,144	20,906	66,455	198,190	355,794	158,442	68,866	69,527	35,172
Nonstocked	--	--	--	--	--	--	--	--	--	--
All types	8,688,845	184,334	231,525	218,407	783,349	1,186,521	1,422,244	1,368,241	1,087,967	1,125,383

Table 45.--Net volume of growing stock on timberland by forest type, stand-size class, and basal-area class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack-red-white pine															
Sawtimber	13,592	--	--	--	--	--	--	--	--	3,842	--	4,126	--	5,624	--
Poletimber	12,630	--	--	--	--	--	--	--	--	--	--	9,130	3,500	--	--
Sapling & seedling	380	--	--	--	--	--	--	380	--	--	--	--	--	--	--
All stands	26,602	--	--	--	--	--	--	380	--	3,842	--	13,256	3,500	5,624	--
Shortleaf pine															
Sawtimber	12,388	--	--	--	--	--	--	--	613	2,220	--	6,302	3,253	--	--
Poletimber	19,419	--	--	--	--	--	--	--	--	--	--	19,419	--	--	--
Sapling & seedling	744	--	--	--	--	744	--	--	--	--	--	--	--	--	--
All stands	32,551	--	--	--	--	744	--	--	613	2,220	--	25,721	3,253	--	--
Scotch-Virginia pine															
Sawtimber	20,658	--	--	--	--	--	--	--	--	5,763	--	8,711	6,184	--	--
Poletimber	7,747	--	--	--	--	1,458	--	--	1,578	958	3,753	--	--	--	--
Sapling & seedling	4,697	--	603	108	--	--	713	2,868	405	--	--	--	--	--	--
All stands	33,102	--	603	108	--	1,458	713	2,868	1,983	6,721	3,753	8,711	6,184	--	--
Oak-pine															
Sawtimber	40,881	--	--	--	--	1,086	--	2,236	--	6,370	3,107	20,970	7,112	--	--
Poletimber	12,774	--	--	--	--	--	--	1,425	4,814	2,791	--	3,744	--	--	--
Sapling & seedling	7,016	--	104	--	--	605	3,439	2,508	360	--	--	--	--	--	--
All stands	60,671	--	104	--	--	1,691	3,439	6,169	5,174	9,161	3,107	24,714	7,112	--	--
Oak-hickory															
Sawtimber	851,178	--	--	--	1,340	9,296	22,485	16,395	64,711	175,166	144,513	304,155	96,564	13,121	3,432
Poletimber	94,381	--	--	--	--	--	12,769	17,316	31,901	7,500	9,235	12,599	3,061	--	--
Sapling & seedling	46,784	157	2,447	3,331	1,408	2,580	18,871	11,019	4,378	2,593	--	--	--	--	--
All stands	992,343	157	2,447	3,331	2,748	11,876	54,125	44,730	100,990	185,259	153,748	316,754	99,625	13,121	3,432
Chestnut-scarlet oak															
Sawtimber	73,089	--	--	--	--	--	1,755	3,076	--	16,976	14,175	26,515	10,592	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	73,089	--	--	--	--	--	1,755	3,076	--	16,976	14,175	26,515	10,592	--	--
Sassafras-persimmon															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	4,196	--	--	--	--	--	--	--	1,881	--	--	2,315	--	--	--
Sapling & seedling	1,459	--	--	--	--	1,459	--	--	--	--	--	--	--	--	--
All stands	5,655	--	--	--	--	1,459	--	--	1,881	--	--	2,315	--	--	--
Oak-gum															
Sawtimber	32,471	--	--	--	227	--	--	--	--	--	9,247	16,935	6,062	--	--
Poletimber	2,376	--	--	--	--	--	--	--	--	--	--	2,376	--	--	--
Sapling & seedling	746	--	--	--	746	--	--	--	--	--	--	--	--	--	--
All stands	35,593	--	--	--	973	--	--	--	--	--	9,247	19,311	6,062	--	--

(Table 45 continued on next page)

(Table 45 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Lowland oak															
Sawtimber	2,690	--	--	--	--	--	--	--	--	2,690	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	2,690	--	--	--	--	--	--	--	--	2,690	--	--	--	--	--
Elm-ash-soft maple															
Sawtimber	168,701	--	--	1,320	1,425	5,716	2,046	7,928	18,368	21,811	28,354	40,035	28,148	13,550	--
Poletimber	49,465	--	--	--	1,942	3,106	3,649	3,981	11,303	9,692	--	15,792	--	--	--
Sapling & seedling	21,053	--	--	34	5,315	6,444	2,095	2,258	4,907	--	--	--	--	--	--
All stands	239,219	--	--	1,354	8,682	15,266	7,790	14,167	34,578	31,503	28,354	55,827	28,148	13,550	--
Cottonwood															
Sawtimber	2,873	--	--	--	--	--	--	--	2,873	--	--	--	--	--	--
Poletimber	1,568	--	--	--	--	--	1,568	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	4,441	--	--	--	--	--	1,568	--	2,873	--	--	--	--	--	--
Maple-beech															
Sawtimber	464,613	--	--	936	1,714	10,040	37,667	26,312	73,271	68,664	58,987	134,382	52,640	--	--
Poletimber	43,809	--	--	--	--	2,002	7,090	4,545	9,830	2,084	3,225	15,033	--	--	--
Sapling & seedling	38,788	--	1,192	213	2,772	8,039	3,780	12,287	8,408	--	2,097	--	--	--	--
All stands	547,210	--	1,192	1,149	4,486	20,081	48,537	43,144	91,509	70,748	64,309	149,415	52,640	--	--
Cherry-ash-yellow-poplar															
Sawtimber	228,799	--	--	--	--	1,319	4,328	11,315	14,795	30,525	17,147	85,831	54,326	1,852	7,361
Poletimber	40,939	--	--	--	--	--	800	--	9,510	7,518	--	11,703	11,408	--	--
Sapling & seedling	18,657	145	646	1,594	1,627	3,247	2,234	1,116	6,483	1,565	--	--	--	--	--
All stands	288,395	145	646	1,594	1,627	4,566	7,362	12,431	30,788	39,608	17,147	97,534	65,734	1,852	7,361
Nonstocked	183	103	80	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	1,911,933	--	--	2,256	4,706	27,457	68,281	67,262	174,631	334,027	275,530	647,962	264,881	34,147	10,793
Poletimber	289,304	--	--	--	1,942	6,566	25,876	27,267	70,817	30,543	16,213	92,111	17,969	--	--
Sapling & seedling	140,324	302	4,992	5,280	11,868	23,118	31,132	32,436	24,941	4,158	2,097	--	--	--	--
Nonstocked	183	103	80	--	--	--	--	--	--	--	--	--	--	--	--
All stands	2,341,744	405	5,072	7,536	18,516	57,141	125,289	126,965	270,389	368,728	293,840	740,073	282,850	34,147	10,793

Table 46.--Net volume of sawtimber on timberland by forest type, stand-size class, and basal-area class, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack-red-white pine															
Sawtimber	51,140	--	--	--	--	--	--	--	--	17,110	--	15,955	--	18,075	--
Poletimber	26,432	--	--	--	--	--	--	--	--	--	--	18,668	7,764	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	77,572	--	--	--	--	--	--	--	--	17,110	--	34,623	7,764	18,075	--
Shortleaf pine															
Sawtimber	46,294	--	--	--	--	--	--	--	2,509	9,869	--	22,232	11,684	--	--
Poletimber	44,090	--	--	--	--	--	--	--	--	--	--	44,090	--	--	--
Sapling & seedling	1,897	--	--	--	--	1,897	--	--	--	--	--	--	--	--	--
All stands	92,281	--	--	--	--	1,897	--	--	2,509	9,869	--	66,322	11,684	--	--
Scotch-Virginia pine															
Sawtimber	88,998	--	--	--	--	--	--	--	--	25,544	--	35,830	27,624	--	--
Poletimber	18,681	--	--	--	--	1,099	--	--	6,864	579	10,139	--	--	--	--
Sapling & seedling	10,878	--	1,223	557	--	--	--	9,098	--	--	--	--	--	--	--
All stands	118,557	--	1,223	557	--	1,099	--	9,098	6,864	26,123	10,139	35,830	27,624	--	--
Oak-pine															
Sawtimber	169,734	--	--	--	--	3,939	--	6,944	--	24,913	7,686	95,696	30,556	--	--
Poletimber	23,527	--	--	--	--	--	--	1,095	9,701	5,020	--	7,711	--	--	--
Sapling & seedling	23,256	--	539	--	--	--	13,902	8,815	--	--	--	--	--	--	--
All stands	216,517	--	539	--	--	3,939	13,902	16,854	9,701	29,933	7,686	103,407	30,556	--	--
Oak-hickory															
Sawtimber	3,401,493	--	--	--	6,874	37,676	85,375	50,358	260,906	688,272	583,829	1,218,733	402,960	52,444	14,066
Poletimber	200,186	--	--	--	--	--	23,350	40,539	72,347	15,272	18,414	22,542	7,722	--	--
Sapling & seedling	136,988	769	9,514	8,113	--	6,187	61,775	28,029	16,590	6,011	--	--	--	--	--
All stands	3,738,667	769	9,514	8,113	6,874	43,863	170,500	118,926	349,843	709,555	602,243	1,241,275	410,682	52,444	14,066
Chestnut-scarlet oak															
Sawtimber	315,322	--	--	--	--	--	5,167	13,284	--	72,411	62,472	114,902	47,086	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	315,322	--	--	--	--	--	5,167	13,284	--	72,411	62,472	114,902	47,086	--	--
Sassafras-persimmon															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	10,373	--	--	--	--	--	--	--	2,485	--	--	7,888	--	--	--
Sapling & seedling	5,696	--	--	--	--	5,696	--	--	--	--	--	--	--	--	--
All stands	16,069	--	--	--	--	5,696	--	--	2,485	--	--	7,888	--	--	--
Oak-gum															
Sawtimber	129,940	--	--	--	1,184	--	--	--	--	--	36,043	63,841	28,872	--	--
Poletimber	3,662	--	--	--	--	--	--	--	--	--	--	3,662	--	--	--
Sapling & seedling	3,839	--	--	--	3,839	--	--	--	--	--	--	--	--	--	--
All stands	137,441	--	--	--	5,023	--	--	--	--	--	36,043	67,503	28,872	--	--

(Table 46 continued on next page)

[1/] International 1/4-inch rule.

(Table 46 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Lowland oak															
Sawtimber	11,516	--	--	--	--	--	--	--	--	11,516	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	11,516	--	--	--	--	--	--	--	--	11,516	--	--	--	--	--
Elm-ash-soft-maple															
Sawtimber	683,725	--	--	6,628	7,120	24,683	10,646	30,286	71,230	81,955	103,701	169,256	115,054	63,166	--
Poletimber	113,594	--	--	--	5,173	4,594	3,980	11,050	21,314	23,508	--	43,975	--	--	--
Sapling & seedling	49,249	--	--	88	10,181	15,131	8,715	6,526	8,608	--	--	--	--	--	--
All Stands	846,568	--	--	6,716	22,474	44,408	23,341	47,862	101,152	105,463	103,701	213,231	115,054	63,166	--
Cottonwood															
Sawtimber	13,538	--	--	--	--	--	--	--	13,538	--	--	--	--	--	--
Poletimber	801	--	--	--	--	--	801	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	14,339	--	--	--	--	--	801	--	13,538	--	--	--	--	--	--
Maple-beech															
Sawtimber	1,889,603	--	--	3,339	7,196	38,000	151,881	99,422	308,462	276,385	235,044	544,230	225,644	--	--
Poletimber	95,422	--	--	--	--	4,458	17,492	9,215	13,893	3,375	6,234	40,755	--	--	--
Sapling & seedling	96,149	--	1,142	--	7,413	19,968	8,455	34,276	22,373	--	2,522	--	--	--	--
All stands	2,081,174	--	1,142	3,339	14,609	62,426	177,828	142,913	344,728	279,760	243,800	584,985	225,644	--	--
Cherry-ash-yellow-poplar															
Sawtimber	884,748	--	--	--	--	5,891	16,593	35,922	47,558	109,535	66,722	350,106	209,703	6,466	36,252
Poletimber	87,024	--	--	--	--	--	3,090	--	23,126	20,810	--	17,829	22,169	--	--
Sapling & seedling	51,050	--	--	2,397	4,523	7,232	9,542	--	20,868	6,488	--	--	--	--	--
All stands	1,022,822	--	--	2,397	4,523	13,123	29,225	35,922	91,552	136,833	66,722	367,935	231,872	6,466	36,252
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	7,686,051	--	--	9,967	22,374	110,189	269,662	236,216	704,203	1,317,510	1,095,497	2,630,781	1,099,183	140,151	50,318
Poletimber	623,792	--	--	--	5,173	10,151	48,713	61,899	149,730	68,564	34,787	207,120	37,655	--	--
Sapling & seedling	379,002	769	12,418	11,155	25,956	56,111	102,389	86,744	68,439	12,499	2,522	--	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	8,688,845	769	12,418	21,122	53,503	176,451	420,764	384,859	922,372	1,398,573	1,132,806	2,837,901	1,136,838	140,151	50,318

Table 47.--Net volume of growing stock and sawtimber on timberland by county and species group, Knobs Unit, Indiana, 1986

County	Growing stock					Sawtimber				
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Thousand cubic feet					Thousand board feet[1/]				
Brown	190,259	8,195	2,461	48,910	130,693	714,793	29,540	6,691	174,604	503,958
Clark	112,526	7,291	1,740	31,268	72,227	420,750	27,797	4,946	110,599	277,408
Crawford	157,423	4,623	2,146	42,229	108,425	582,098	15,055	5,262	148,508	413,273
Dubois	124,001	4,060	1,594	34,760	83,587	470,282	16,686	3,692	125,336	324,568
Floyd	47,433	1,374	543	14,521	30,995	180,034	5,916	1,206	54,808	118,104
Harrison	175,761	6,689	3,656	51,713	113,703	641,916	24,888	8,139	178,209	430,680
Jackson	159,454	5,021	2,711	44,822	106,900	575,103	13,959	6,485	151,358	403,301
Lawrence	180,706	3,411	1,620	45,880	129,795	687,495	12,534	4,411	166,445	504,105
Monroe	165,021	3,820	1,713	45,161	114,327	618,137	12,813	4,049	160,031	441,244
Morgan	109,257	3,048	1,986	32,002	72,221	401,468	10,326	4,788	113,332	273,022
Orange	176,616	6,318	3,205	47,124	119,969	648,722	19,654	8,536	164,657	455,875
Owen	140,177	4,755	2,055	43,397	89,970	528,332	20,687	4,748	162,214	340,683
Perry	213,369	12,765	3,221	51,015	146,368	778,940	38,823	9,271	175,047	555,799
Scott	55,632	2,236	924	15,822	36,650	205,427	8,010	2,247	54,767	140,403
Spencer	78,458	2,959	1,315	22,610	51,574	291,161	11,500	3,100	78,946	197,615
Warrick	95,835	4,284	2,011	30,517	59,023	340,965	13,605	4,750	102,429	220,181
Washington	159,816	7,721	2,246	49,255	100,594	603,222	33,974	4,898	183,363	380,987
All counties	2,341,744	88,570	35,147	651,006	1,567,021	8,688,845	315,767	87,219	2,304,653	5,981,206

[1/] International 1/4-inch rule.

Table 48.--Net volume of sawtimber on timberland by species group and tree grade, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Species group	All species	Tree grade			
		1	2	3	Tie and timber
Softwoods					
Jack pine	11,740	--	--	11,740	--
Red pine	1,419	--	--	1,419	--
White pine	67,842	6,862	1,475	55,743	3,762
Shortleaf pine	68,730	--	7,560	61,170	--
Other yellow pines	166,036	--	6,658	158,444	934
Baldcypress	1,470	--	--	1,470	--
Eastern redcedar	85,749	--	2,177	82,700	872
Other softwoods	--	--	--	--	
Total	402,986	6,862	17,870	372,686	5,568
Hardwoods					
Select white oak	1,513,684	276,806	424,147	551,290	261,441
Other white oak	504,344	14,171	91,143	219,837	179,193
Select red oak	528,072	38,262	87,280	144,451	258,079
Other red oak	1,114,880	63,258	162,960	325,432	563,230
Select hickory	365,595	13,660	46,543	133,001	172,391
Other hickory	473,390	20,689	67,955	187,733	197,013
Basswood	39,506	10,575	8,393	14,390	6,148
Beech	344,282	--	2,268	32,529	309,485
Hard maple	652,881	17,967	66,566	221,917	346,431
Soft maple	214,027	2,834	29,186	66,721	115,286
Elm	87,445	6,224	23,782	39,404	18,035
Ash	335,958	53,289	100,823	137,719	44,127
Sycamore	353,628	94,810	96,002	116,744	46,072
Cottonwood	70,251	10,517	9,555	18,283	31,896
Willow	875	--	--	--	875
Hackberry	54,805	1,129	17,261	25,601	10,814
Aspen	60,134	--	2,302	14,890	42,942
Birch	17,010	916	1,887	3,540	10,667
Sweetgum	124,250	12,046	25,244	48,475	38,485
Tupelo	81,172	4,180	16,492	25,667	34,833
Black cherry	121,534	6,549	30,914	45,397	38,674
Black walnut	111,301	9,754	28,969	59,220	13,358
Butternut	4,008	--	--	2,596	1,412
Yellow-poplar	998,660	90,501	128,383	213,661	566,115
Persimmon	7,502	--	1,909	5,593	--
Sassafras	76,266	3,408	13,803	44,842	14,213
Other hardwoods	30,399	--	5,528	10,724	14,147
Total	8,285,859	751,545	1,489,295	2,709,657	3,335,362
All species	8,688,845	758,407	1,507,165	3,082,343	3,340,930

[1/] International 1/4-inch rule.

Table 49.--Net volume of short-log trees on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods											
Jack pine	--	--	--	--	--	--	--	--	--	--	--
Red pine	--	--	--	--	--	--	--	--	--	--	--
White pine	--	--	--	--	--	--	--	--	--	--	--
Shortleaf pine	26	26	--	--	--	--	--	--	--	--	--
Other yellow pines	132	--	--	--	--	--	--	132	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	735	465	130	140	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	893	491	130	140	--	--	--	132	--	--	--
Hardwoods											
Select white oak	5,242	--	726	665	244	794	250	490	1,352	615	106
Other white oak	1,745	--	359	103	829	128	170	--	156	--	--
Select red oak	1,857	--	--	275	114	207	301	174	124	662	--
Other red oak	4,403	--	524	103	374	411	1,242	454	839	182	274
Select hickory	1,745	--	111	603	201	167	306	190	167	--	--
Other hickory	1,820	--	589	541	129	--	--	154	407	--	--
Basswood	125	--	--	--	--	125	--	--	--	--	--
Beech	4,541	--	--	654	530	948	696	602	305	647	159
Hard maple	5,474	--	1,000	1,149	796	485	639	666	730	9	--
Soft maple	3,179	--	856	385	872	404	--	161	261	240	--
Elm	1,572	--	521	329	106	380	122	--	--	114	--
Ash	1,174	--	235	205	306	97	--	--	133	198	--
Sycamore	1,847	--	--	405	562	--	328	--	--	472	80
Cottonwood	283	--	115	--	--	--	168	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--	--	--
Hackberry	380	--	111	--	120	--	--	--	149	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	225	--	--	--	147	--	--	--	--	78	--
Tupelo	459	--	118	124	118	--	--	--	99	--	--
Black cherry	1,749	--	124	253	752	412	--	136	--	72	--
Black walnut	1,051	--	223	284	116	--	--	--	230	78	120
Butternut	127	--	127	--	--	--	--	--	--	--	--
Yellow-poplar	2,279	--	731	636	--	601	46	56	--	59	150
Persimmon	--	--	--	--	--	--	--	--	--	--	--
Sassafras	1,692	--	313	173	244	333	116	--	513	--	--
Other hardwoods	1,226	--	475	120	300	129	202	--	--	--	--
Total	44,195	--	7,258	7,007	6,860	5,621	4,586	3,083	5,465	3,426	889
All species	45,088	491	7,388	7,147	6,860	5,621	4,586	3,215	5,465	3,426	889

Table 50.--Net volume of short-log trees on timberland by species group and diameter class, Knobs Unit, 1986

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods											
Jack pine	--	--	--	--	--	--	--	--	--	--	--
Red pine	--	--	--	--	--	--	--	--	--	--	--
White pine	--	--	--	--	--	--	--	--	--	--	--
Shortleaf pine	129	129	--	--	--	--	--	--	--	--	--
Other yellow pines	362	--	--	--	--	--	--	362	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	3,491	2,353	581	557	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	3,982	2,482	581	557	--	--	--	362	--	--	--
Hardwoods											
Select white oak	15,943	--	2,691	2,322	808	2,458	770	1,396	3,584	1,632	282
Other white oak	5,767	--	1,332	358	2,745	397	522	--	413	--	--
Select red oak	5,474	--	--	960	377	640	922	494	327	1,754	--
Other red oak	13,333	--	1,947	359	1,238	1,273	3,803	1,287	2,219	483	724
Select hickory	5,623	--	413	2,108	666	516	937	540	443	--	--
Other hickory	6,021	--	2,190	1,889	428	--	--	437	1,077	--	--
Basswood	388	--	--	--	--	388	--	--	--	--	--
Beech	13,769	--	--	2,285	1,755	2,941	2,134	1,710	809	1,715	420
Hard maple	17,669	--	3,712	4,012	2,635	1,503	1,958	1,891	1,934	24	--
Soft maple	10,431	--	3,173	1,343	2,887	1,249	--	456	689	634	--
Elm	5,280	--	1,935	1,145	352	1,175	373	--	--	300	--
Ash	3,774	--	870	715	1,013	300	--	--	352	524	--
Sycamore	5,742	--	--	1,414	1,861	--	1,004	--	--	1,252	211
Cottonwood	942	--	427	--	--	--	515	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--	--	--
Hackberry	1,204	--	413	--	396	--	--	--	395	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--
Birch	--	--	--	--	--	--	--	--	--	--	--
Sweetgum	694	--	--	--	488	--	--	--	--	206	--
Tupelo	1,520	--	437	431	390	--	--	--	262	--	--
Black cherry	5,687	--	460	882	2,490	1,277	--	387	--	191	--
Black walnut	3,330	--	825	990	384	--	--	--	607	206	318
Butternut	473	--	473	--	--	--	--	--	--	--	--
Yellow-poplar	7,646	--	2,713	2,220	--	1,862	140	159	--	156	396
Persimmon	--	--	--	--	---	--	--	--	--	--	--
Sassafras	5,317	--	1,160	604	808	1,030	355	--	1,360	--	--
Other hardwoods	4,190	--	1,762	418	993	399	618	--	--	--	--
Total	140,217	--	26,933	24,455	22,714	17,408	14,051	8,757	14,471	9,077	2,351
All species	144,199	2,482	27,514	25,012	22,714	17,408	14,051	9,119	14,471	9,077	2,351

[1/] International 1/4-inch rule.

Table 51.--Net annual growth of growing stock and sawtimber on timberland by softwoods and hardwoods, Knobs Unit, Indiana, 1966 and 1985

Species group	Growing stock		Sawtimber	
	1966[1/]	1985	1966[1/]	1985
	Thousand cubic feet		Thousand board feet[2/]	
Softwoods	2,929	3,938	6,305	24,062
Hardwoods	39,758	56,017	94,041	278,090
All species	42,687	59,955	100,346	302,152

[1/] Figures have been adjusted from those published after the 1967 survey to conform to 1985 volumes because of changes in survey procedures.

[2/] International 1/4-inch rule.

Table 52.--Net annual growth of growing stock on timberland by species group and ownership class, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Species group	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Softwoods									
Jack pine	100	--	--	43	--	--	50	--	7
Red pine	22	--	--	8	--	--	--	--	14
White pine	866	139	--	287	--	--	295	87	58
Shortleaf pine	-24	-131	--	--	--	--	87	2	18
Other yellow pines	1,575	-5	-4	115	--	--	504	277	688
Baldcypress	13	--	--	--	--	--	--	13	--
Eastern redcedar	986	22	10	22	--	--	470	17	445
Other softwoods	400	--	--	145	--	--	255	--	--
Total	3,938	25	6	620	--	--	1,661	396	1,230
Hardwoods									
Select white oak	8,262	1,218	280	1,110	42	106	2,140	518	2,848
Other white oak	1,832	306	45	320	31	14	283	105	728
Select red oak	3,067	261	236	153	--	48	830	202	1,337
Other red oak	6,519	658	177	634	--	41	1,821	277	2,911
Select hickory	1,483	61	71	7	--	21	622	96	605
Other hickory	1,890	230	77	47	6	26	702	10	792
Basswood	118	4	32	15	--	--	-4	-11	82
Beech	1,441	55	33	46	--	21	482	150	654
Hard maple	7,150	498	307	298	--	41	2,159	610	3,237
Soft maple	3,119	187	175	313	--	--	1,111	316	1,017
Elm	-794	13	-8	-58	--	83	-498	-210	-116
Ash	2,907	345	107	138	--	--	909	155	1,253
Sycamore	2,661	351	57	18	--	--	628	630	977
Cottonwood	177	--	-29	--	--	--	54	193	-41
Willow	0	--	--	--	-14	--	-6	5	15
Hackberry	621	--	11	15	2	--	395	24	174
Aspen	509	114	98	2	--	--	21	144	130
Birch	123	3	6	--	--	--	55	4	55
Sweetgum	899	12	--	10	--	--	197	20	660
Tupelo	548	45	78	7	--	-35	263	24	166
Black cherry	1,040	28	42	179	78	-11	323	18	383
Black walnut	560	-35	28	15	--	4	286	7	255
Butternut	-14	--	--	--	5	--	-2	--	-17
Yellow-poplar	8,996	579	240	475	--	13	2,998	746	3,945
Persimmon	235	1	--	14	--	--	66	21	133
Sassafras	1,909	465	15	96	--	42	195	77	1,019
Other hardwoods	759	23	31	--	--	--	125	120	460
Total	56,017	5,422	2,109	3,854	150	414	16,155	4,251	23,662
All species	59,955	5,447	2,115	4,474	150	414	17,816	4,647	24,892

Table 53.--Net annual growth of sawtimber on timberland by species group and ownership class, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Species group	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. priv.-corp.	Misc. priv.-indiv.
Softwoods									
Jack pine	419	--	--	218	--	--	164	--	37
Red pine	35	--	--	--	--	--	--	--	35
White pine	11,542	6,263	--	1,081	--	--	2,449	1,756	-7
Shortleaf pine	1,816	1,312	--	--	--	--	223	--	281
Other yellow pines	5,357	--	--	468	--	--	1,485	513	2,891
Baldcypress	72	--	--	--	--	--	--	72	--
Eastern redcedar	4,821	114	13	125	--	--	482	931	3,156
Other softwoods	--	--	--	--	--	--	--	--	--
Total	24,062	7,689	13	1,892	--	--	4,803	3,272	6,393
Hardwoods									
Select white oak	45,534	7,275	1,514	4,804	276	370	11,197	7,538	12,560
Other white oak	10,257	2,024	237	1,551	126	51	1,370	777	4,121
Select red oak	16,388	1,781	1,271	637	--	203	3,519	820	8,157
Other red oak	33,154	3,689	783	2,518	--	199	9,549	1,338	15,078
Select hickory	5,505	453	250	57	--	78	1,729	456	2,482
Other hickory	13,178	2,072	82	278	9	164	2,210	303	8,060
Basswood	524	--	180	67	--	--	-34	-16	327
Beech	7,078	117	116	265	--	73	2,346	812	3,349
Hard maple	33,345	1,722	1,881	1,843	--	141	6,437	2,364	18,957
Soft maple	8,300	48	1,814	14	--	--	2,477	260	3,687
Elm	-2,877	-22	-56	-73	--	-118	-676	-967	-965
Ash	14,419	1,336	301	1,046	--	--	3,185	1,370	7,181
Sycamore	12,980	430	200	142	--	--	3,413	5,066	3,729
Cottonwood	1,550	--	-101	--	--	--	253	640	758
Willow	-47	--	--	--	--	--	-61	--	14
Hackberry	2,205	--	50	28	11	--	794	76	1,246
Aspen	4,284	262	459	--	--	--	97	3,108	358
Birch	323	9	20	--	--	--	135	--	159
Sweetgum	2,814	105	--	123	--	--	440	7	2,139
Tupelo	3,518	90	--	-6	--	-189	1,118	111	2,394
Black cherry	9,742	133	99	140	31	-58	7,542	108	1,747
Black walnut	4,945	44	134	45	2	6	4,345	29	340
Butternut	-60	--	--	--	28	--	-40	--	-48
Yellow-poplar	46,518	2,292	1,723	2,070	--	38	14,840	2,607	22,948
Persimmon	170	--	--	--	--	--	61	45	64
Sassafras	3,211	36	31	29	--	88	331	996	1,700
Other hardwoods	1,132	114	114	14	--	--	687	-18	221
Total	278,090	24,010	11,102	15,592	483	1,046	77,264	27,830	120,763
All species	302,152	31,699	11,115	17,484	483	1,046	82,067	31,102	127,156

[1/] International 1/4-inch rule.

Table 54.--Net annual growth of growing stock on timberland by species group and forest type, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Species group	All types	Forest type														
		Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods															
Jack pine	100	50	--	--	7	--	--	--	--	--	--	--	--	43	--
Red pine	22	8	--	--	--	6	--	--	8	--	--	--	--	--	--
White pine	866	511	--	60	145	108	--	--	--	--	16	--	2	24	--
Shortleaf pine	-24	-113	181	--	--	-51	--	--	--	--	3	--	--	-44	--
Other yellow pines	1,575	29	-59	1,199	199	87	--	10	--	--	80	30	4	-4	--
Baldcypress	13	--	--	--	--	--	--	--	--	--	13	--	--	--	--
Eastern redcedar	986	-33	2	116	320	320	--	--	--	--	54	--	106	101	--
Other softwoods	400	--	--	202	--	--	--	--	12	--	--	--	133	53	--
Total	3,938	452	124	1,577	671	470	--	10	20	--	166	30	245	173	--
Hardwoods															
Select white oak	8,262	19	--	20	75	6,215	206	13	23	--	222	--	1,151	318	--
Other white oak	1,832	--	4	--	44	849	697	5	12	--	-14	--	199	36	--
Select red oak	3,067	16	24	2	59	1,732	1	--	16	--	137	--	802	278	--
Other red oak	6,519	1	13	38	228	4,786	138	17	103	21	307	--	559	308	--
Select hickory	1,483	13	-5	6	35	851	3	--	44	4	145	--	259	128	--
Other hickory	1,890	6	2	--	37	1,476	-70	--	--	--	9	--	332	98	--
Basswood	118	--	--	--	--	-3	4	--	--	--	-25	--	142	--	--
Beech	1,441	--	2	--	--	216	--	--	112	--	5	--	1,048	58	--
Hard maple	7,150	--	20	115	51	1,980	59	-3	6	--	340	--	4,113	469	--
Soft maple	3,119	32	21	16	--	474	146	--	241	8	1,296	19	746	120	--
Elm	-794	4	--	-4	-20	-386	--	-10	-5	--	-163	--	-173	-37	--
Ash	2,907	--	37	4	66	748	--	-10	74	--	577	--	404	1,007	--
Sycamore	2,661	53	17	19	14	457	--	--	61	--	1,061	-4	680	303	--
Cottonwood	177	36	--	--	--	6	--	--	--	--	51	91	2	-9	--
Willow	0	--	--	--	--	--	--	--	--	--	5	--	-14	--	9
Hackberry	621	--	--	--	4	47	--	--	--	--	350	--	78	142	--
Aspen	509	--	--	--	--	339	--	--	--	--	7	--	88	75	--
Birch	123	--	--	--	--	--	--	--	9	--	110	--	--	4	--
Sweetgum	899	5	--	--	-2	73	--	--	287	12	292	--	7	225	--
Tupelo	548	--	1	18	30	206	-8	--	21	64	59	--	62	95	--
Black cherry	1,040	142	6	12	10	93	--	--	--	--	85	--	463	223	6
Black walnut	560	--	--	--	19	64	--	--	2	--	221	--	81	173	--
Butternut	-14	--	--	--	--	--	--	--	--	--	--	--	-6	-8	--
Yellow-poplar	8,996	62	118	30	100	1,779	--	38	175	--	1,020	12	1,779	3,883	--
Persimmon	235	--	--	5	6	130	--	11	2	--	30	--	46	5	--
Sassafras	1,909	--	8	6	13	875	--	35	69	--	112	--	448	343	--
Other hardwoods	759	--	--	96	-10	65	--	--	--	--	344	-23	192	95	--
Total	56,017	389	268	383	759	23,072	1,176	96	1,252	109	6,583	95	13,488	8,332	15
All species	59,955	841	392	1,960	1,430	23,542	1,176	106	1,272	109	6,749	125	13,733	8,505	15

Table 55.--Net annual growth of sawtimber on timberland by species group and forest type, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Species group	All types	Forest type													
		Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods															
Jack pine	419	164	--	--	37	--	--	--	--	--	--	--	--	218	--
Red pine	35	--	--	--	--	35	--	--	--	--	--	--	--	--	--
White pine	11,542	9,424	--	194	905	904	--	--	--	--	58	--	--	57	--
Shortleaf pine	1,816	248	864	--	--	96	--	--	--	--	--	--	--	608	--
Other yellow pines	5,357	78	-21	3,086	1,023	615	--	56	--	--	175	--	345	--	--
Baldcypress	72	--	--	--	--	--	--	--	--	--	72	--	--	--	--
Eastern redcedar	4,821	--	--	247	1,563	-86	--	--	--	--	--	--	2,994	103	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	24,062	9,914	843	3,527	3,528	1,564	--	56	--	--	305	--	3,339	986	--
Hardwoods															
Select white oak	45,534	90	--	85	439	30,925	981	42	89	--	6,121	--	5,418	1,344	--
Other white oak	10,257	--	21	--	86	5,646	3,124	--	62	--	-68	--	1,237	149	--
Select red oak	16,388	67	118	10	323	9,707	-37	--	80	--	608	--	4,651	861	--
Other red oak	33,154	4	38	192	3,238	23,483	488	60	561	78	1,613	--	1,964	1,435	--
Select hickory	5,505	20	-28	31	165	3,025	-4	--	241	--	310	--	1,427	318	--
Other hickory	13,178	22	12	--	77	7,903	-192	--	--	--	42	--	4,948	366	--
Basswood	524	--	--	--	--	26	23	--	--	--	-126	--	601	--	--
Beech	7,078	--	8	--	--	1,605	--	--	14	--	-73	--	5,351	173	--
Hard maple	33,345	--	27	33	1,451	4,607	106	103	11	--	496	--	25,245	1,266	--
Soft maple	8,300	--	--	24	--	340	14	--	174	46	5,041	103	2,255	303	--
Elm	-2,877	--	--	--	--	-1,241	--	-47	43	--	-1,507	--	-897	772	--
Ash	14,419	34	55	--	240	3,722	--	-55	263	--	2,240	--	1,621	6,299	--
Sycamore	12,980	38	110	989	31	900	--	--	238	--	6,218	-52	3,123	1,385	--
Cottonwood	1,550	1,135	--	--	--	30	--	--	--	--	122	298	11	-46	--
Willow	-47	--	--	--	--	--	--	--	--	--	-47	--	--	--	--
Hackberry	2,205	--	--	--	--	135	--	--	--	--	546	--	1,075	449	--
Aspen	4,284	--	--	--	--	3,703	--	--	--	--	2	--	282	297	--
Birch	323	--	--	--	--	--	--	--	30	--	276	--	--	17	--
Sweetgum	2,814	--	--	--	26	333	--	--	983	57	664	--	47	704	--
Tupelo	3,518	--	6	--	17	544	-43	--	-28	--	958	--	1,981	83	--
Black cherry	9,742	--	--	--	-52	1,247	--	--	--	--	197	--	2,895	5,455	--
Black walnut	4,945	--	--	--	47	189	--	--	11	--	3,811	--	183	704	--
Butternut	-60	--	--	--	--	--	--	--	--	--	--	--	-60	--	--
Yellow-poplar	46,518	98	428	191	993	7,048	--	196	916	--	6,276	--	9,410	20,962	--
Persimmon	170	--	--	--	--	28	--	--	--	--	--	--	81	61	--
Sassafras	3,211	--	--	29	18	1,095	--	37	--	--	227	--	889	916	--
Other hardwoods	1,132	--	--	--	--	175	--	--	--	--	863	-37	177	-46	--
Total	278,090	1,508	795	1,584	7,099	105,175	4,460	336	3,688	181	34,810	312	73,915	44,227	--
All species	302,152	11,422	1,638	5,111	10,627	106,739	4,460	392	3,688	181	35,115	312	77,254	45,213	--

[1/] International 1/4-inch rule.

Table 56.--Net annual growth of growing stock on timberland by forest type and stand-age class, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Forest type	All ages	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack-red-white pine	841	--	242	422	177	--	--	--	--	--	--	--	--	--
Shortleaf pine	392	-51	--	--	440	43	-40	--	--	--	--	--	--	--
Scotch-Virginia pine	1,960	131	552	211	671	349	--	46	--	--	--	--	--	--
Oak-pine	1,430	62	144	206	90	613	159	15	141	--	--	--	--	--
Oak-hickory	23,542	752	1,629	632	2,044	2,314	3,552	4,112	2,983	3,150	1,183	1,047	145	-1
Chestnut-scarlet oak	1,176	--	--	--	--	--	84	234	158	243	201	35	221	--
Sassafras-persimmon	106	45	31	--	--	--	30	--	--	--	--	--	--	--
Oak-gum	1,272	-7	11	--	60	698	69	338	--	18	--	85	--	--
Lowland oak	109	--	--	--	--	--	--	109	--	--	--	--	--	--
Elm-ash-soft maple	6,749	212	1,156	1,049	1,569	941	694	844	222	13	15	34	--	--
Cottonwood	125	--	85	--	--	--	--	40	--	--	--	--	--	--
Maple-beech	13,733	1,019	1,150	403	2,181	755	2,494	1,857	1,438	1,272	701	463	--	--
Cherry-ash-yellow-poplar	8,505	328	486	1,024	1,959	2,614	1,119	422	293	126	134	--	--	--
Nonstocked	15	15	--	--	--	--	--	--	--	--	--	--	--	--
All types	59,955	2,506	5,486	3,947	9,191	8,327	8,161	8,017	5,235	4,822	2,234	1,664	366	-1

Table 57.--Net annual growth of sawtimber on timberland by forest type and stand-age class, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Forest type	All ages	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Jack-red-white pine	11,422	--	--	9,259	2,163	--	--	--	--	--	--	--	--	--
Shortleaf pine	1,638	65	--	--	1,236	236	101	--	--	--	--	--	--	--
Scotch-Virginia pine	5,111	--	472	46	2,985	1,474	--	134	--	--	--	--	--	--
Oak-pine	10,627	87	2,824	274	196	4,710	2,113	104	319	--	--	--	--	--
Oak-hickory	106,739	4,236	5,730	1,232	3,528	11,489	18,069	18,468	11,583	21,048	5,873	4,844	626	13
Chestnut-scarlet oak	4,460	--	--	--	--	--	391	1,080	368	1,041	1,046	137	397	--
Sassafras-persimmon	392	158	59	--	--	--	175	--	--	--	--	--	--	--
Oak-gum	3,688	--	62	--	123	1,889	276	1,022	--	-2	--	318	--	--
Lowland oak	181	--	--	--	--	--	--	181	--	--	--	--	--	--
Elm-ash-soft maple	35,115	122	2,010	1,263	8,453	12,577	6,373	3,316	682	145	46	128	--	--
Cottonwood	312	--	28	--	--	--	--	284	--	--	--	--	--	--
Maple-beech	77,254	5,360	9,386	1,286	7,675	5,145	16,274	12,708	7,631	6,222	3,274	2,293	--	--
Cherry-ash-yellow-poplar	45,213	1,068	859	2,262	15,189	10,491	11,913	1,310	1,175	501	445	--	--	--
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types	302,152	11,096	21,430	15,622	41,548	48,011	55,685	38,607	21,758	28,955	10,684	7,720	1,023	13

[1/] International 1/4-inch rule.

Table 58.--Net annual growth of growing stock on timberland by forest type, stand-size class, and basal-area class, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack-red-white pine															
Sawtimber	98	--	--	--	--	--	--	--	--	-79	--	110	--	67	--
Poletimber	501	--	--	--	--	--	--	--	--	--	--	320	181	--	--
Sapling & seedling	242	--	--	--	--	--	--	242	--	--	--	--	--	--	--
All stands	841	--	--	--	--	--	--	242	--	-79	--	430	181	67	--
Shortleaf pine															
Sawtimber	19	--	--	--	--	--	--	--	-16	-36	--	12	59	--	--
Poletimber	424	--	--	--	--	--	--	--	--	--	--	424	--	--	--
Sapling & seedling	-51	--	--	--	--	-51	--	--	--	--	--	--	--	--	--
All stands	392	--	--	--	--	-51	--	--	-16	-36	--	436	59	--	--
Scotch-Virginia pine															
Sawtimber	703	--	--	--	--	--	--	--	--	173	--	286	244	--	--
Poletimber	658	--	--	--	--	202	--	--	89	93	274	--	--	--	--
Sapling & seedling	599	--	191	9	--	--	205	178	16	--	--	--	--	--	--
All stands	1,960	--	191	9	--	202	205	178	105	266	274	286	244	--	--
Oak-pine															
Sawtimber	827	--	--	--	--	29	--	-4	--	159	106	470	67	--	--
Poletimber	397	--	--	--	--	--	--	53	136	62	--	146	--	--	--
Sapling & seedling	206	--	7	--	--	23	62	98	16	--	--	--	--	--	--
All stands	1,430	--	7	--	--	52	62	147	152	221	106	616	67	--	--
Oak-hickory															
Sawtimber	17,813	--	--	--	-13	205	537	365	1,632	3,802	3,395	5,828	1,774	236	52
Poletimber	3,348	--	--	--	--	--	467	690	1,425	198	109	390	69	--	--
Sapling & seedling	2,381	120	235	420	64	74	552	531	302	83	--	--	--	--	--
All stands	23,542	120	235	420	51	279	1,556	1,586	3,359	4,083	3,504	6,218	1,843	236	52
Chestnut-scarlet oak															
Sawtimber	1,176	--	--	--	--	--	42	-24	--	288	205	578	87	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	1,176	--	--	--	--	--	42	-24	--	288	205	578	87	--	--
Sassafras-persimmon															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	61	--	--	--	--	--	--	--	31	--	--	30	--	--	--
Sapling & seedling	45	--	--	--	--	45	--	--	--	--	--	--	--	--	--
All stands	106	--	--	--	--	45	--	--	31	--	--	30	--	--	--
Oak-gum															
Sawtimber	1,208	--	--	--	39	--	--	--	--	--	350	789	30	--	--
Poletimber	60	--	--	--	--	--	--	--	--	--	--	60	--	--	--
Sapling & seedling	4	--	--	--	11	--	-7	--	--	--	--	--	--	--	--
All stands	1,272	--	--	--	50	--	-7	--	--	--	350	849	30	--	--

(Table 58 continued on next page)

(Table 58 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Lowland oak															
Sawtimber	109	--	--	--	--	--	--	--	--	109	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	109	--	--	--	--	--	--	--	--	109	--	--	--	--	--
Elm-ash-soft maple															
Sawtimber	3,503	--	--	54	-36	-9	73	372	377	728	587	950	239	168	--
Poletimber	2,299	--	--	--	-36	194	228	104	574	361	--	874	--	--	--
Sapling & seedling	947	--	--	2	31	296	56	83	479	--	--	--	--	--	--
All stands	6,749	--	--	56	-41	481	357	559	1,430	1,089	587	1,824	239	168	--
Cottonwood															
Sawtimber	40	--	--	--	--	--	--	--	40	--	--	--	--	--	--
Poletimber	85	--	--	--	--	--	85	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	125	--	--	--	--	--	85	--	40	--	--	--	--	--	--
Maple-beech															
Sawtimber	9,953	--	--	21	38	214	844	730	1,679	1,604	1,206	2,522	1,095	--	--
Poletimber	1,669	--	--	--	--	62	364	263	273	180	107	420	--	--	--
Sapling & seedling	2,111	--	267	1	287	601	213	454	206	--	82	--	--	--	--
All stands	13,733	--	267	22	325	877	1,421	1,447	2,158	1,784	1,395	2,942	1,095	--	--
Cherry-ash-yellow-poplar															
Sawtimber	6,210	--	--	--	--	68	171	404	448	890	441	2,322	1,179	45	242
Poletimber	1,481	--	--	--	--	--	34	--	671	156	--	295	325	--	--
Sapling & seedling	814	5	45	43	58	184	59	60	278	82	--	--	--	--	--
All stands	8,505	5	45	43	58	252	264	464	1,397	1,128	441	2,617	1,504	45	242
Nonstocked	15	9	6	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	41,659	--	--	75	28	507	1,667	1,843	4,160	7,638	6,290	13,867	4,774	516	294
Poletimber	10,983	--	--	--	-36	458	1,178	1,110	3,199	1,050	490	2,959	575	--	--
Sapling & seedling	7,298	125	745	475	451	1,172	1,140	1,646	1,297	165	82	--	--	--	--
Nonstocked	15	9	6	--	--	--	--	--	--	--	--	--	--	--	--
All stands	59,955	134	751	550	443	2,137	3,985	4,599	8,656	8,853	6,862	16,826	5,349	516	294

Table 59.--Net annual growth of sawtimber on timberland by forest type, stand-size class, and basal-area class, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack-red-white pine															
Sawtimber	8,518	--	--	--	--	--	--	--	--	6,355	--	446	--	1,717	--
Poletimber	2,904	--	--	--	--	--	--	--	--	--	--	1,345	1,559	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	11,422	--	--	--	--	--	--	--	--	6,355	--	1,791	1,559	1,717	--
Shortleaf pine															
Sawtimber	715	--	--	--	--	--	--	--	-34	32	--	494	223	--	--
Poletimber	858	--	--	--	--	--	--	--	--	--	--	858	--	--	--
Sapling & seedling	65	--	--	--	--	65	--	--	--	--	--	--	--	--	--
All stands	1,638	--	--	--	--	65	--	--	-34	32	--	1,352	223	--	--
Scotch-Virginia pine															
Sawtimber	3,447	--	--	--	--	--	--	--	--	1,800	--	746	901	--	--
Poletimber	1,339	--	--	--	--	-1	--	--	580	194	566	--	--	--	--
Sapling & seedling	325	--	29	47	--	--	--	249	--	--	--	--	--	--	--
All stands	5,111	--	29	47	--	-1	--	249	580	1,994	566	746	901	--	--
Oak-pine															
Sawtimber	7,034	--	--	--	--	918	--	123	--	1,328	255	4,102	308	--	--
Poletimber	682	--	--	--	--	--	--	2	346	105	--	229	--	--	--
Sapling & seedling	2,911	--	37	--	--	--	245	2,629	--	--	--	--	--	--	--
All stands	10,627	--	37	--	--	918	245	2,754	346	1,433	255	4,331	308	--	--
Oak-hickory															
Sawtimber	89,377	--	--	--	18	2,282	2,275	2,387	8,712	20,746	15,277	29,739	6,865	841	235
Poletimber	7,396	--	--	--	--	--	749	1,682	2,626	1,124	295	702	218	--	--
Sapling & seedling	9,966	631	1,846	1,075	--	914	1,108	2,824	1,433	135	--	--	--	--	--
All stands	106,739	631	1,846	1,075	18	3,196	4,132	6,893	12,771	22,005	15,572	30,441	7,083	841	235
Chestnut-scarlet oak															
Sawtimber	4,460	--	--	--	--	--	223	-150	--	1,376	956	1,616	439	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	4,460	--	--	--	--	--	223	-150	--	1,376	956	1,616	439	--	--
Sassafras-persimmon															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	234	--	--	--	--	--	--	--	59	--	--	175	--	--	--
Sapling & seedling	158	--	--	--	--	158	--	--	--	--	--	--	--	--	--
All stands	392	--	--	--	--	158	--	--	59	--	--	175	--	--	--
Oak-gum															
Sawtimber	3,503	--	--	--	156	--	--	--	--	--	588	2,639	120	--	--
Poletimber	123	--	--	--	--	--	--	--	--	--	--	123	--	--	--
Sapling & seedling	62	--	--	--	62	--	--	--	--	--	--	--	--	--	--
All stands	3,688	--	--	--	218	--	--	--	--	--	588	2,762	120	--	--

(Table 59 continued on next page)

[1/] International 1/4-inch rule.

(Table 59 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Lowland oak															
Sawtimber	181	--	--	--	--	--	--	--	--	181	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	181	--	--	--	--	--	--	--	--	181	--	--	--	--	--
Elm-ash-soft maple															
Sawtimber	30,490	--	--	3,771	-133	-160	448	530	3,676	4,720	2,201	11,941	1,915	1,581	--
Poletimber	3,980	--	--	--	-450	194	-2	300	907	1,140	--	1,891	--	--	--
Sapling & seedling	645	--	--	4	-170	213	236	153	209	--	--	--	--	--	--
All stands	35,115	--	--	3,775	-753	247	682	983	4,792	5,860	2,201	13,832	1,915	1,581	--
Cottonwood															
Sawtimber	284	--	--	--	--	--	--	--	284	--	--	--	--	--	--
Poletimber	28	--	--	--	--	--	28	--	--	--	--	--	--	--	--
Sapling & seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	312	--	--	--	--	--	28	--	284	--	--	--	--	--	--
Maple-beech															
Sawtimber	54,584	--	--	73	933	1,730	5,592	2,196	9,216	10,281	5,195	13,188	6,180	--	--
Poletimber	8,139	--	--	--	--	103	3,588	2,025	1,236	61	127	999	--	--	--
Sapling & seedling	14,531	--	1,669	3	579	2,633	940	8,045	563	--	97	--	--	--	2
All stands	77,254	--	1,669	76	1,512	4,466	10,120	12,266	11,015	10,342	5,419	14,187	6,180	--	2
Cherry-ash-yellow-poplar															
Sawtimber	40,677	--	--	--	--	217	369	5,562	795	9,444	908	16,058	6,460	130	734
Poletimber	2,609	--	--	--	--	--	117	--	832	689	--	444	527	--	--
Sapling & seedling	1,927	--	--	118	103	300	237	--	823	346	--	--	--	--	--
All stands	45,213	--	--	118	103	517	723	5,562	2,450	10,479	908	16,502	6,987	130	734
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	243,270	--	--	3,844	974	4,987	8,907	10,648	22,649	56,263	25,380	80,969	23,411	4,269	969
Poletimber	28,292	--	--	--	-450	296	4,480	4,009	6,586	3,313	988	6,766	2,304	--	--
Sapling & seedling	30,590	631	3,581	1,247	574	4,283	2,766	13,900	3,028	481	97	--	--	--	2
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All stands	302,152	631	3,581	5,091	1,098	9,566	16,153	28,557	32,263	60,057	26,465	87,735	25,715	4,269	971

Table 60.--Net annual growth of growing stock and sawtimber on timberland by county and species group, Knobs Unit, Indiana, 1985

County	Growing stock					Sawtimber				
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Thousand cubic feet					Thousand board feet[1]				
Brown	4,654	240	67	1,438	2,909	24,286	1,648	466	7,434	14,738
Clark	2,893	254	53	927	1,659	14,448	893	273	5,403	7,879
Crawford	4,004	102	60	1,350	2,492	20,157	1,566	345	5,885	12,361
Dubois	3,104	186	55	962	1,901	16,156	667	334	5,155	10,000
Floyd	1,183	56	17	361	749	7,060	238	70	2,170	4,582
Harrison	4,656	273	105	1,632	2,646	21,435	1,397	364	7,529	12,145
Jackson	4,288	173	72	1,587	2,456	19,395	1,477	265	5,802	11,851
Lawrence	4,363	117	38	1,351	2,857	23,390	1,223	490	6,565	15,112
Monroe	4,172	164	54	1,403	2,551	20,487	668	426	6,200	13,193
Morgan	2,897	130	58	994	1,715	13,312	604	202	4,698	7,808
Orange	4,454	127	69	1,518	2,740	22,590	2,254	317	6,438	13,581
Owen	3,600	185	79	1,136	2,200	20,066	817	233	6,155	12,861
Perry	5,268	190	62	1,657	3,359	27,709	2,895	371	7,084	17,359
Scott	1,474	101	28	497	848	6,801	359	139	2,377	3,926
Spencer	2,085	137	44	710	1,194	9,485	542	194	3,207	5,542
Warrick	2,781	211	66	1,058	1,446	11,369	603	180	4,256	6,330
Washington	4,079	293	72	1,247	2,467	24,006	1,318	224	7,368	15,096
All counties	59,955	2,939	999	19,828	36,189	302,152	19,169	4,893	93,726	184,364

[1] International 1/4-inch rule.

Table 61.--Current annual timber removals from growing stock and sawtimber on timberland by species group, Knobs Unit, Indiana, 1966 and 1985

Species group	Growing stock		Sawtimber	
	1966	1985	1966	1985
	Thousand cubic feet		Thousand board feet[1]	
Softwoods				
Pine	63	151	208	721
Baldcypress	2	--	--	--
Other softwoods	35	101	40	179
Total	100	252	248	900
Hardwoods				
Select white oak	2,262	5,191	12,698	25,305
Other white oak	584	2,306	3,186	10,908
Select red oak	1,983	4,366	11,114	22,166
Other red oak	4,481	9,200	24,972	47,087
Hickory	1,190	3,120	5,451	14,621
Basswood	63	156	391	739
Beech	1,251	1,410	7,077	7,195
Hard maple	1,209	2,646	7,000	12,196
Soft maple	1,069	771	5,375	3,736
Elm	192	247	1,113	1,009
Ash	829	2,448	4,433	11,284
Sycamore	949	1,079	5,264	5,419
Cottonwood	612	304	2,832	1,660
Aspen	125	65	572	271
Sweetgum	595	486	3,035	2,558
Tupelo	361	282	1,857	1,436
Black cherry	95	476	615	2,464
Black walnut	704	479	4,410	2,865
Yellow-poplar	1,683	5,192	10,732	27,323
Other hardwoods	256	503	1,119	2,080
Total	20,493	40,727	113,246	202,322
All species	20,593	40,979	113,494	203,222

[1] International 1/4-inch rule.

Table 62.--Average annual timber removals from growing stock and sawtimber on timberland by county and species group, Knobs Unit, Indiana 1966 to 1985

County	Growing stock					Sawtimber				
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Thousand cubic feet					Thousand board feet[1]				
Brown	2,994	7	11	305	2,671	12,877	29	34	1,265	11,549
Clark	1,247	3	4	183	1,057	5,436	15	14	759	4,648
Crawford	2,412	4	5	271	2,132	9,645	16	18	1,081	8,530
Dubois	1,375	6	15	187	1,167	6,153	28	41	797	5,287
Floyd	777	35	17	87	638	3,483	186	18	388	2,891
Harrison	1,764	5	17	331	1,411	7,575	26	82	1,359	6,108
Jackson	1,940	2	6	262	1,670	7,986	9	24	1,067	6,886
Lawrence	2,330	6	11	240	2,073	9,744	30	25	966	8,723
Monroe	4,194	6	12	398	3,778	17,000	30	27	1,625	15,318
Morgan	1,271	2	6	230	1,033	5,317	10	21	949	4,337
Orange	2,063	3	6	285	1,769	8,297	12	24	1,135	7,126
Owen	1,570	9	28	224	1,309	7,013	41	43	979	5,950
Perry	2,968	7	5	274	2,682	11,895	13	19	1,105	10,758
Scott	651	1	3	94	553	2,874	5	16	388	2,465
Spencer	910	2	5	133	770	3,913	9	21	543	3,340
Warrick	1,023	4	4	176	839	4,356	16	16	734	3,590
Washington	1,811	9	40	268	1,494	7,998	44	75	1,172	6,707
All counties	31,300	111	195	3,948	27,046	131,562	519	518	16,312	114,213

[1] International 1/4-inch rule.

Table 63.--Average annual timber removals from growing stock and sawtimber on timberland by species group, Knobs Unit, Indiana, 1966 to 1985

Species group	Growing stock	Sawtimber
	Thousand cubic feet	Thousand board feet 1/
Softwoods		
Jack pine	--	--
Red pine	--	--
White pine	--	--
Shortleaf pine	6	--
Other yellow pines	105	519
Baldcypress	--	--
Eastern redcedar	195	518
Other softwoods	--	--
Total	306	1,037
Hardwoods		
Select white oak	7,439	32,619
Other white oak	2,712	11,150
Select red oak	3,312	15,647
Other red oak	5,356	25,022
Select hickory	1,692	6,121
Other hickory	1,580	5,620
Basswood	136	640
Beech	714	3,081
Hard maple	2,019	7,250
Soft maple	410	1,670
Elm	419	1,404
Ash	1,502	5,352
Sycamore	546	2,535
Cottonwood	39	77
Willow	52	205
Hackberry	74	330
Aspen	32	--
Birch	273	1,219
Sweetgum	191	821
Tupelo	150	632
Black cherry	301	1,124
Black walnut	321	1,221
Butternut	24	--
Yellow-poplar	1,194	5,881
Persimmon	31	--
Sassafras	294	531
Other hardwoods	181	373
Total	30,994	130,525
All species	31,300	131,562

1/ International 1/4-inch rule.

Table 64.--Current annual timber removals from growing stock and sawtimber on timberland by item and species group, Knobs Unit, Indiana, 1985

GROWING STOCK

Item	All species	Species group				
		Softwoods	Oak	Maple	Hickory	Other hardwoods
			Thousand cubic feet			
Roundwood products						
Sawlogs	23,484	132	11,918	1,896	1,724	7,814
Veneer logs	791	--	566	19	18	188
Pulpwood 1/	1,227	--	458	121	135	513
Fuelwood	1,251	7	621	116	170	337
Handle bolts	501	--	--	128	39	334
Cooperage	436	--	436	--	--	--
Other	41	6	11	--	5	19
Total	27,731	145	14,010	2,280	2,091	9,205
Logging residue	7,684	10	3,792	644	581	2,657
Other removals	5,564	97	3,261	493	448	1,265
All removals	40,979	252	21,063	3,417	3,120	13,127

SAWTIMBER

			Thousand board feet 2/			
Roundwood products						
Sawlogs	140,131	714	69,918	11,160	10,512	47,827
Veneer logs	5,784	--	4,140	142	135	1,367
Pulpwood 1/	5,344	--	1,991	528	588	2,237
Fuelwood	3,862	23	1,905	364	537	1,033
Handle bolts	2,433	--	--	623	191	1,619
Cooperage	2,624	--	2,624	--	--	--
Other	84	3	18	--	6	57
Total	160,262	740	80,596	12,817	11,969	54,140
Logging residue	22,611	14	12,019	1,561	1,610	7,407
Other removals	20,349	146	12,851	1,554	1,042	4,756
All removals	203,222	900	105,466	15,932	14,621	66,303

1/ Includes particle board and waferboard bolts.

Table 65.--Net annual growth and current annual timber removals from growing stock and sawtimber on timberland by species group, Knobs Unit, Indiana, 1985

Species group	Growing stock		Sawtimber	
	Growth	Removals	Growth	Removals
	Thousand cubic feet		Thousand board feet[1/]	
Softwoods				
Pine	2,539	151	19,169	721
Baldcypress	13	--	72	--
Eastern redcedar	986	101	4,821	179
Other softwoods	400	--	--	--
Total	3,938	252	24,062	900
Hardwoods				
Select white oak	8,262	5,191	45,534	25,305
Other white oak	1,832	2,306	10,257	10,908
Select red oak	3,067	4,366	16,388	22,166
Other red oak	6,519	9,200	33,154	47,087
Select hickory	1,483	1,320	5,505	6,408
Other hickory	1,890	1,800	13,178	8,213
Basswood	118	156	524	739
Beech	1,441	1,410	7,078	7,195
Hard maple	7,150	2,646	33,345	12,196
Soft maple	3,119	771	8,300	3,736
Elm	-794	247	-2,877	1,009
Ash	2,907	2,448	14,419	11,284
Sycamore	2,661	1,079	12,980	5,419
Cottonwood	177	304	1,550	1,660
Aspen	509	65	4,284	271
Birch	123	221	323	1,085
Sweetgum	899	486	2,814	2,558
Tupelo	548	282	3,518	1,436
Black cherry	1,040	476	9,742	2,464
Black walnut	560	479	4,945	2,865
Yellow-poplar	8,996	5,192	46,518	27,323
Other hardwoods	3,510	282	6,611	995
Total	56,017	40,727	278,090	202,322
All species	59,955	40,979	302,152	203,222

[1/] International 1/4-inch rule.

Table 66.--Net annual growth and current annual timber removals of growing stock on timberland by ownership class and species group, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Ownership class	Growth					Removals				
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	5,447	3	22	1,799	3,623	3,696	8	--	221	3,467
Miscellaneous fed.	2,115	-4	10	742	1,367	63	--	--	6	57
State	4,474	598	22	1,072	2,782	1,370	2	1	133	1,234
County and municipal	150	--	--	71	79	--	--	--	--	--
Forest industry	414	--	--	92	322	855	1	--	--	854
Farmer	17,816	1,191	470	5,724	10,431	15,606	--	65	3,353	12,188
Misc. private-corp.	4,647	366	30	1,967	2,284	3,566	--	--	1,238	2,328
Misc. private-indiv.	24,892	785	445	8,361	15,301	15,823	140	35	4,389	11,259
All ownerships	59,955	2,939	999	19,828	36,189	40,979	151	101	9,340	31,387

Table 67.--Net annual growth and current annual timber removals of sawtimber on timberland by ownership class and species group, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Ownership class	Growth					Removals				
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	31,699	7,575	114	3,381	20,629	16,465	32	--	957	15,476
Miscellaneous fed.	11,115	--	13	4,513	6,589	289	--	--	30	259
State	17,484	1,767	125	2,534	13,058	6,772	9	5	695	6,063
County and municipal	483	--	--	70	413	--	--	--	--	--
Forest industry	1,046	--	--	-239	1,285	4,543	6	--	--	4,537
Farmer	82,067	4,321	482	31,369	45,895	79,933	--	61	18,452	61,420
Misc. private-corp.	31,102	2,269	1,003	11,978	15,852	14,513	--	--	4,900	9,613
Misc. private-indiv.	127,156	3,237	3,156	40,120	80,643	80,707	674	113	22,576	57,344
All ownerships	302,152	19,169	4,893	93,726	184,364	203,222	721	179	47,610	154,712

[1/] International 1/4-inch rule.

Table 68.--Annual mortality of growing stock on timberland by softwoods and hardwoods, Knobs Unit, Indiana, 1966 and 1985

(In thousand cubic feet)

Species group	1966 [1/]	1985
Softwoods	207	1,769
Hardwoods	4,158	20,382
All species	4,365	22,151

[1/] Figures have been adjusted from those published after the 1966 survey to conform to 1985 volumes because of changes in survey procedures.

Table 69.--Annual mortality of growing stock and sawtimber on timberland by species group, Knobs Unit, Indiana, 1985

Species group	Growing stock	Sawtimber
	Thousand cubic feet	Thousand board feet [1/]
Softwoods		
Jack pine	20	5
Red pine	4	8
White pine	105	311
Shortleaf pine	835	958
Other yellow pines	513	1,181
Baldcypress	4	18
Eastern redcedar	242	737
Other softwoods	46	--
Total	1,769	3,218
Hardwoods		
Select white oak	1,169	3,297
Other white oak	779	2,604
Select red oak	925	3,719
Other red oak	2,382	9,752
Select hickory	984	2,758
Other hickory	1,274	4,079
Basswood	68	240
Beech	625	2,123
Hard maple	1,387	3,568
Soft maple	790	2,200
Elm	2,383	6,069
Ash	892	2,253
Sycamore	869	3,522
Cottonwood	349	1,595
Willow	78	331
Hackberry	148	352
Aspen	293	643
Birch	75	247
Sweetgum	423	1,243
Tupelo	234	896
Black cherry	450	902
Black walnut	395	728
Butternut	39	138
Yellow-poplar	1,810	6,968
Persimmon	132	52
Sassafras	1,084	775
Other hardwoods	345	568
Total	20,382	61,622
All species	22,151	64,840

[1/] International 1/4-inch rule.

Table 70.--Annual mortality of growing stock on timberland by species group and cause of death, Knobs Unit, Indiana, 1985

(In thousand cubic feet)

Species group	All causes	Cause of death						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
Softwoods								
Jack pine	20	--	--	--	--	--	--	20
Red pine	4	--	--	--	--	--	--	4
White pine	105	--	--	--	--	--	--	105
Shortleaf pine	835	--	--	--	--	27	60	748
Other yellow pines	513	--	--	16	--	175	--	322
Baldcypress	4	--	--	--	--	--	--	4
Eastern redcedar	242	--	--	--	--	--	--	242
Other softwoods	46	--	--	--	--	--	--	46
Total	1,769	--	--	16	--	202	60	1,491
Hardwoods								
Select white oak	1,169	--	65	--	--	12	27	1,065
Other white oak	779	--	146	--	--	106	--	527
Select red oak	925	--	94	--	11	68	--	752
Other red oak	2,382	--	343	--	--	233	--	1,806
Select hickory	984	--	15	--	--	34	--	935
Other hickory	1,274	14	141	--	--	58	--	1,061
Basswood	68	--	--	--	--	--	--	68
Beech	625	--	106	--	--	76	13	430
Hard maple	1,387	--	25	--	--	92	--	1,270
Soft maple	790	--	--	--	--	308	--	482
Elm	2,383	--	185	--	--	140	--	2,058
Ash	892	--	37	--	--	25	--	830
Sycamore	869	--	200	--	--	154	--	515
Cottonwood	349	--	--	--	--	221	--	128
Willow	78	--	--	--	--	--	--	78
Hackberry	148	--	--	--	--	55	38	55
Aspen	293	--	87	--	--	9	--	197
Birch	75	--	--	--	--	--	--	75
Sweetgum	423	--	--	--	--	--	--	423
Tupelo	234	--	31	--	--	--	--	203
Black cherry	450	59	17	--	--	--	--	374
Black walnut	395	--	83	--	--	--	--	312
Butternut	39	--	--	--	--	9	--	30
Yellow-poplar	1,810	--	--	--	--	494	--	1,316
Persimmon	132	--	--	--	--	--	--	132
Sassafras	1,084	--	176	--	--	--	32	876
Other hardwoods	345	--	14	--	--	--	--	331
Total	20,382	73	1,765	--	11	2,094	110	16,329
All species	22,151	73	1,765	16	11	2,296	170	17,820

Table 71.--Annual mortality of sawtimber on timberland by species group and cause of death, Knobs Unit, Indiana, 1985

(In thousand board feet)[1/]

Species group	All causes	Cause of death						
		Insects	Disease	Fire	Animals	Weather	Suppression	Unknown and other
Softwoods								
Jack pine	5	--	--	--	--	--	--	5
Red pine	8	--	--	--	--	--	--	8
White pine	311	--	--	--	--	--	--	311
Shortleaf pine	958	--	--	--	--	--	--	958
Other yellow pines	1,181	--	--	--	--	480	--	701
Baldcypress	18	--	--	--	--	--	--	18
Eastern redcedar	737	--	--	--	--	--	--	737
Other softwoods	--	--	--	--	--	--	--	--
Total	3,218	--	--	--	--	480	--	2,738
Hardwoods								
Select white oak	3,297	--	358	--	--	--	--	2,939
Other white oak	2,604	--	785	--	--	495	--	1,324
Select red oak	3,719	--	479	--	--	398	--	2,842
Other red oak	9,752	--	1,550	--	--	983	--	7,219
Select hickory	2,758	--	--	--	--	141	--	2,617
Other hickory	4,079	--	290	--	--	325	--	3,464
Basswood	240	--	--	--	--	--	--	240
Beech	2,123	--	428	--	--	241	50	1,404
Hard maple	3,568	--	99	--	--	271	--	3,198
Soft maple	2,200	--	--	--	--	1,358	--	842
Elm	6,069	--	371	--	--	500	--	5,198
Ash	2,253	--	192	--	--	129	--	1,932
Sycamore	3,522	--	956	--	--	732	--	1,834
Cottonwood	1,595	--	--	--	--	1,076	--	519
Willow	331	--	--	--	--	--	--	331
Hackberry	352	--	--	--	--	352	--	--
Aspen	643	--	--	--	--	--	--	643
Birch	247	--	--	--	--	--	--	247
Sweetgum	1,243	--	--	--	--	--	--	1,243
Tupelo	896	--	154	--	--	--	--	742
Black cherry	902	135	--	--	--	--	--	767
Black walnut	728	--	--	--	--	--	--	728
Butternut	138	--	--	--	--	48	--	90
Yellow-poplar	6,968	--	--	--	--	2,416	--	4,552
Persimmon	52	--	--	--	--	--	--	52
Sassafras	775	--	146	--	--	--	--	629
Other hardwoods	568	--	--	--	--	--	--	568
Total	61,622	135	5,808	--	--	9,465	50	46,164
All species	64,840	135	5,808	--	--	9,945	50	48,902

[1/] International 1/4-inch rule.

Table 72.--Annual mortality of growing stock and sawtimber on timberland by ownership class and species group, Knobs Unit, Indiana, 1985

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			Thousand board feet[1/]		
National forest	2,214	755	1,459	4,286	862	3,424
Miscellaneous federal	620	19	601	1,915	4	1,911
State	1,784	187	1,597	5,227	339	4,888
County and municipal	78	--	78	339	--	339
Forest industry	217	--	217	882	--	882
Farmer	6,213	208	6,005	18,870	274	18,596
Misc. private-corp.	2,270	89	2,181	7,036	167	6,869
Misc. private-indiv.	8,755	511	8,244	26,285	1,572	24,713
All owners	22,151	1,769	20,382	64,840	3,218	61,622

[1/] International 1/4-inch rule.

Table 73.--Output of timber products by product, softwoods and hardwoods, and source of material, Knobs Unit, Indiana, 1984

Product	Standard units	Total		Roundwood products				Plant byproducts	
				Growing stock		Non-growing stock			
		No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet	No. of units	Thousand cubic feet
Saw logs									
Softwoods	Thousand[1/]	722	132	722	132	--	--	--	--
Hardwoods	board feet	149,037	24,888	139,839	23,352	9,198	1,536	--	--
Total		149,759	25,020	140,561	23,484	9,198	1,536	--	--
Veneer logs									
Softwoods	Thousand[1/]	--	--	--	--	--	--	--	--
Hardwoods	board feet	5,850	800	5,784	791	66	9	--	--
Total		5,850	800	5,784	791	66	9	--	--
Pulpwood[2/]									
Softwoods	Standard[3/]	--	--	--	--	--	--	--	--
Hardwoods	cords	98,341	7,769	15,535	1,227	7,989	631	74,817	5,911
Total		98,341	7,769	15,535	1,227	7,989	631	74,817	5,911
Fuelwood									
Softwoods	Standard[3/]	744	51	103	7	370	25	271	19
Hardwoods	cords	207,237	14,498	17,788	1,244	110,978	7,761	78,471	5,493
Total		207,981	14,549	17,891	1,251	111,348	7,786	78,742	5,512
Handle bolts									
Softwoods	Thousand[1/]	--	--	--	--	--	--	--	--
Hardwoods	board feet	3,484	564	3,095	501	389	63	--	--
Total		3,484	564	3,095	501	389	63	--	--
Cooperage									
Softwoods	Thousand[1/]	--	--	--	--	--	--	--	--
Hardwoods	board feet	2,924	482	2,645	436	279	46	--	--
Total		2,924	482	2,645	436	279	46	--	--
Other[4/]									
Softwoods	Thousand	14	14	6	6	2	2	6	6
Hardwoods	cubic feet	1,432	1,432	35	35	8	8	1,389	1,389
Total		1,446	1,446	41	41	10	10	1,395	1,395
All products									
Softwoods	Thousand	--	197	--	145	--	27	--	25
Hardwoods	cubic feet	--	50,433	--	27,586	--	10,054	--	12,793
Total		--	50,630	--	27,731	--	10,081	--	12,818

[1/] International 1/4-inch rule.

[2/] Includes roundwood and plant byproducts used for particleboard and waferboard.

[3/] 128 cubic feet; includes wood, bark, and air space.

[4/] Other (industrial production) includes posts, poles, shingle bolts, pilings, etc.

Table 74.--Output of roundwood products by product, softwoods and hardwoods, and source of material, Knobs Unit, Indiana, 1984

(In thousand cubic feet)

Product and species group	All sources	Growing-stock trees			Rough and rotten trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
Industrial products							
Saw logs							
Softwoods	132	132	132	--	--	--	--
Hardwoods	24,888	23,352	23,352	--	99	419	1,018
Subtotal	25,020	23,484	23,484	--	99	419	1,018
Veneer logs							
Softwoods	--	--	--	--	--	--	--
Hardwoods	800	791	791	--	--	--	9
Subtotal	800	791	791	--	--	--	9
Pulpwood[1/]							
Softwoods	--	--	--	--	--	--	--
Hardwoods	1,858	1,227	1,154	73	301	9	321
Subtotal	1,858	1,227	1,154	73	301	9	321
Cooperage							
Softwoods	--	--	--	--	--	--	--
Hardwoods	482	436	436	--	44	--	2
Subtotal	482	436	436	--	44	--	2
Piling							
Softwoods	--	--	--	--	--	--	--
Hardwoods	3	3	3	--	--	--	--
Subtotal	3	3	3	--	--	--	--
Poles							
Softwoods	--	--	--	--	--	--	--
Hardwoods	13	13	--	13	--	--	--
Subtotal	13	13	--	13	--	--	--
Handle bolts							
Softwoods	--	--	--	--	--	--	--
Hardwoods	564	501	386	115	63	--	--
Subtotal	564	501	386	115	63	--	--
Posts (Round and split)							
Softwoods	8	6	2	4	--	--	2
Hardwoods	27	19	14	5	4	--	4
Subtotal	35	25	16	9	4	--	6
Other							
Softwoods	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	--
Subtotal	--	--	--	--	--	--	--
All industrial products							
Softwoods	140	138	134	4	--	--	2
Hardwoods	28,635	26,342	26,136	206	511	428	1,354
Total	28,775	26,480	26,270	210	511	428	1,356
Fuelwood							
Softwoods	32	7	4	3	1	10	14
Hardwoods	9,005	1,244	746	498	251	2,549	4,961
Total	9,037	1,251	750	501	252	2,559	4,975
All products							
Softwoods	172	145	138	7	1	10	16
Hardwoods	37,640	27,586	26,882	704	762	2,977	6,315
Total	37,812	27,731	27,020	711	763	2,987	6,331

[1/] Includes particleboard and waferboard bolts.

Table 75.--Timber products from roundwood by species group and product, Knobs Unit, Indiana, 1984

Species group	All products	Saw logs		Veneer logs		Pulpwood[1]	
	Thousand cubic feet	Thousand board feet[2]	Thousand cubic feet	Thousand board feet[2]	Thousand cubic feet	Standard cords[3]	Thousand cubic feet
Softwoods							
Pine	126	537	93	--	--	--	--
Baldcypress	--	--	--	--	--	--	--
Eastern redcedar	46	185	39	--	--	--	--
Other softwoods	--	--	--	--	--	--	--
Total	172	722	132	--	--	--	--
Hardwoods							
Select white oak	4,834	14,760	2,497	2,051	280	3,543	280
Other white oak	1,566	4,779	809	664	91	1,147	91
Select red oak	3,920	18,079	3,059	459	63	1,309	104
Other red oak	8,262	38,101	6,448	966	132	2,760	219
Select hickory	1,399	4,698	771	57	8	1,102	87
Other hickory	1,889	6,344	1,042	78	10	1,487	117
Basswood	207	517	85	1	[4]	372	29
Beech	1,359	5,634	926	--	--	893	70
Hard maple	2,435	8,818	1,502	29	4	1,598	126
Soft maple	887	2,928	499	113	15	728	57
Elm	224	380	62	10	1	133	11
Ash	2,239	7,347	1,208	106	15	729	57
Sycamore	1,157	3,614	594	135	18	2,478	196
Cottonwood	362	1,269	197	161	22	393	30
Aspen	49	246	40	--	--	--	--
Birch	53	172	28	14	2	--	--
Sweetgum	447	2,196	361	43	6	129	10
Tupelo	297	946	156	32	4	649	51
Black cherry	449	2,077	340	9	1	688	54
Black walnut	513	2,643	405	513	72	--	--
Yellow-poplar	4,380	23,133	3,800	400	55	3,170	251
Other hardwoods	712	356	59	9	1	216	18
Total	37,640	149,037	24,888	5,850	800	23,524	1,858
All species	37,812	149,759	25,020	5,850	800	23,524	1,858

[1] Includes particleboard and waferboard bolts.

[2] International 1/4-inch rule.

[3] 128 cubic feet; includes wood, bark, and air space.

[4] Less than 500 cubic feet.

(Table 75 continued)

Species group	Fuelwood		Handle Bolts		Cooperage		Other products
	Standard cords [3]	Thousand cubic feet	Thousand board feet [2]	Thousand cubic feet	Thousand board feet [2]	Thousand cubic feet	Thousand cubic feet
Softwoods							
Pine	450	30	--	--	--	--	3
Baldcypress	--	--	--	--	--	--	--
Eastern redcedar	23	2	--	--	--	--	5
Other softwoods	--	--	--	--	--	--	--
Total	473	32	--	--	--	--	8
Hardwoods							
Select white oak	20,122	1,409	--	--	2,214	365	3
Other white oak	6,515	456	--	--	710	117	2
Select red oak	9,882	692	--	--	--	--	2
Other red oak	20,828	1,459	--	--	--	--	4
Select hickory	7,325	512	118	19	--	--	2
Other hickory	9,889	692	155	25	--	--	3
Basswood	1,334	93	--	--	--	--	--
Beech	5,203	363	--	--	--	--	--
Hard maple	9,444	659	892	144	--	--	--
Soft maple	4,516	316	--	--	--	--	--
Elm	2,147	150	--	--	--	--	--
Ash	8,342	583	2,319	376	--	--	--
Sycamore	4,983	349	--	--	--	--	--
Cottonwood	1,615	113	--	--	--	--	--
Aspen	138	9	--	--	--	--	--
Birch	353	23	--	--	--	--	--
Sweetgum	1,001	69	--	--	--	--	1
Tupelo	1,237	86	--	--	--	--	--
Black cherry	782	54	--	--	--	--	--
Black walnut	508	36	--	--	--	--	--
Yellow-poplar	3,899	274	--	--	--	--	--
Other hardwoods	8,703	608	--	--	--	--	26
Total	128,766	9,005	3,484	564	2,924	482	43
All species	129,239	9,037	3,484	564	2,924	482	51

[2] International 1/4-inch rule.

[3] 128 cubic feet; includes wood, bark, and air space.

Table 76.--Volume of primary plant residue by use and type of residue, Knobs Unit, Indiana, 1984

(In thousand cubic feet)

Use	Wood residue						Bark	
	Total		Coarse [1]		Fine [2]			
	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods
Fiber products [3]	7.7	5,256.2	5.8	5,028.1	1.9	228.1	--	31.1
Charcoal	--	--	--	--	--	--	--	--
Industrial fuel	7.7	3,256.4	3.2	381.7	4.5	2,874.7	5.5	2,355.8
Domestic fuel	11.2	2,236.8	11.2	2,151.8	--	85.0	5.7	1,345.1
Miscellaneous [4]	6.1	1,389.2	--	65.4	6.1	1,323.8	0.1	978.6
Not used [5]	20.8	1,360.1	12.9	528.8	7.9	831.3	8.5	630.5
Total	53.5	13,498.7	33.1	8,155.8	20.4	5,342.9	19.8	5,341.1

[1] Suitable for chipping such as slabs, edgings, veneer cores, etc.

[2] Not suitable for chipping such as sawdust, veneer clippings, etc.

[3] For manufacture of pulp, hardboard, or roofing felt.

[4] Livestock bedding, mulch, small dimension, and specialty items.

[5] Includes residue burned as waste.

Table 77.--All live above-ground tree biomass yields on timberland by species group and forest type, Knobs Unit, Indiana, 1986

(In pounds per acre)

Species group	Forest type													
	Jack-red-white pine	Short-leaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods														
Jack pine	4,842	--	121	136	--	--	--	--	--	--	--	--	370	--
Red pine	442	--	--	--	26	--	--	629	--	--	--	--	--	--
White pine	38,396	--	1,883	3,154	187	--	--	--	--	89	--	3	372	--
Shortleaf pine	12,337	72,201	--	25	252	--	--	--	--	17	--	6	151	--
Other yellow pines	1,740	3,242	31,454	12,263	264	--	2,305	--	--	469	10,651	442	--	--
Baldcypress	--	--	--	--	--	--	--	--	--	122	--	--	--	--
Eastern redcedar	1,292	1,168	13,777	32,881	1,175	273	49	170	--	875	--	993	1,973	--
Other softwoods	--	--	2,383	--	6	--	--	1,095	--	--	--	30	287	--
Total	59,049	76,611	49,618	48,459	1,910	273	2,354	1,894	--	1,572	10,651	1,474	3,153	--
Hardwoods														
Select white oak	395	4	2,769	8,345	41,729	26,391	3,674	8,234	--	5,244	--	11,074	7,683	--
Other white oak	--	690	39	5,240	9,000	125,223	1,113	1,449	--	162	--	1,972	716	--
Select red oak	464	5,175	413	3,864	12,170	3,842	--	2,213	--	1,283	1,039	8,006	6,789	--
Other red oak	56	1,496	7,795	17,017	31,974	23,510	3,514	12,203	87,678	5,320	--	5,501	6,619	--
Select hickory	1,634	6,282	661	6,198	10,258	2,625	--	4,876	13,116	4,263	--	6,430	3,867	--
Other hickory	2,242	949	16	5,274	14,309	5,947	--	414	--	2,051	--	6,586	5,934	--
Basswood	--	--	--	--	193	475	--	--	--	3	--	1,339	1	--
Beech	--	232	36	999	4,729	917	--	3,789	--	735	--	22,728	4,250	--
Hard maple	659	9,027	1,732	5,918	11,903	8,857	12,116	1,708	--	5,482	--	44,900	14,708	--
Soft maple	2,529	1,644	927	561	1,748	2,287	--	22,937	30,787	21,275	13,056	5,592	2,759	121
Elm	3,337	1,099	1,261	1,728	2,266	69	72	3,252	559	8,446	--	3,880	4,545	--
Ash	1,892	10,996	727	5,173	4,316	31	499	8,878	--	10,901	--	5,397	14,119	--
Sycamore	3,699	1,601	1,199	953	1,732	--	--	5,375	--	19,659	6,912	4,019	7,182	--
Cottonwood	4,539	--	--	--	85	--	--	--	--	4,944	51,633	83	100	--
Willow	--	--	--	--	35	--	--	--	--	519	--	63	--	2,064
Hackberry	--	352	--	357	331	--	--	--	--	4,198	--	824	2,130	--
Aspen	--	--	--	--	1,287	971	--	--	--	233	--	656	1,444	--
Birch	--	--	--	--	1	--	--	1,408	--	2,608	--	1	127	--
Sweetgum	480	--	31	824	650	--	--	51,532	27,865	5,740	--	483	2,310	--
Tupelo	--	387	1,151	1,929	1,674	980	--	4,819	3,543	2,936	--	1,930	1,273	--
Black cherry	4,920	2,985	1,713	2,967	1,012	--	--	62	--	2,138	--	3,158	4,694	1,495
Black walnut	--	--	303	2,070	1,002	--	--	2,770	--	3,231	--	2,302	6,026	--
Butternut	--	--	--	--	--	--	--	--	--	11	--	257	--	--
Yellow-poplar	4,084	26,603	2,252	6,086	5,913	7	8,129	12,272	--	11,091	2,428	11,469	46,247	223
Persimmon	28	--	1,741	907	496	--	1,540	479	--	964	--	710	340	--
Sassafras	1,873	12,953	1,730	3,662	3,937	1,738	29,371	5,416	--	4,945	1,573	5,157	6,538	--
Other hardwoods	815	4,235	3,269	4,811	2,658	1,049	1,364	4,190	--	8,294	5,610	2,608	4,166	--
Noncommercial spp.	240	788	687	1,755	1,377	237	--	2,835	117	841	--	1,530	1,577	10,888
Total	33,886	87,498	30,452	86,638	166,785	205,156	61,392	161,111	163,665	137,517	82,251	158,655	156,144	14,791
All species	92,935	164,109	80,070	135,097	168,695	205,429	63,746	163,005	163,665	139,089	92,902	160,129	159,297	14,791

Table 78.--All live tree biomass on timberland by species group and forest type, Knobs Unit, Indiana, 1986

(In green tons)

Species group	All types	Forest type						
		Jack-red-white pine	Shortleaf pine	Scotch-Virginia pine	Oak-pine	Oak-hickory	Chestnut-scarlet oak	Sassafras-persimmon
Softwoods								
Jack pine	116,245	72,153	--	2,773	3,680	--	--	--
Red pine	23,525	6,589	--	--	--	8,891	--	--
White pine	812,272	572,093	--	43,016	85,485	64,385	--	--
Shortleaf pine	1,018,695	183,827	729,234	--	679	86,712	--	--
Other yellow pines	1,374,827	25,924	32,749	718,721	332,314	90,923	--	14,290
Baldcypress	12,308	--	--	--	--	--	--	--
Eastern redcedar	2,138,478	19,250	11,800	314,807	891,078	404,886	5,410	306
Other softwoods	105,574	--	--	54,452	--	1,954	--	--
Total	5,601,924	879,836	773,783	1,133,769	1,313,236	657,751	5,410	14,596
Hardwoods								
Select white oak	18,866,527	5,880	44	63,282	226,148	14,379,947	523,867	22,778
Other white oak	6,248,227	--	6,966	899	142,008	3,101,326	2,485,677	6,902
Select red oak	6,904,327	6,911	52,266	9,442	104,719	4,193,896	76,270	--
Other red oak	14,728,135	836	15,111	178,117	461,173	11,018,117	466,664	21,788
Select hickory	6,051,990	24,351	63,446	15,106	167,961	3,534,930	52,097	--
Other hickory	7,375,619	33,410	9,580	368	142,912	4,930,717	118,045	--
Basswood	345,639	--	--	--	--	66,425	9,420	--
Beech	6,803,498	--	2,339	832	27,083	1,629,448	18,207	--
Hard maple	15,755,105	9,825	91,172	39,587	160,379	4,101,602	175,809	75,119
Soft maple	4,653,659	37,676	16,607	21,186	15,190	602,285	45,397	--
Elm	3,059,244	49,716	11,097	28,804	46,842	780,973	1,379	448
Ash	5,525,480	28,186	111,057	16,604	140,199	1,487,327	621	3,091
Sycamore	4,335,367	55,116	16,173	27,390	25,824	596,943	--	--
Cottonwood	738,018	67,628	--	--	--	29,120	--	--
Willow	87,267	--	--	--	--	12,007	--	--
Hackberry	935,004	--	3,551	--	9,667	114,200	--	--
Aspen	765,028	--	--	--	--	443,426	19,275	--
Birch	295,817	--	--	--	--	405	--	--
Sweetgum	1,856,372	7,155	--	713	22,330	223,905	--	--
Tupelo	1,559,015	--	3,905	26,293	52,277	576,782	19,459	--
Black cherry	1,908,489	73,306	30,144	39,133	80,407	348,635	--	--
Black walnut	1,846,612	--	--	6,924	56,087	345,340	--	--
Butternut	52,833	--	--	--	--	--	--	--
Yellow-poplar	10,928,700	60,851	268,689	51,455	164,920	2,037,726	141	50,397
Persimmon	526,452	422	--	39,774	24,577	171,038	--	9,550
Sassafras	4,146,257	27,907	130,822	39,522	99,241	1,356,813	34,506	182,099
Other hardwoods	3,059,440	12,137	42,772	74,705	130,379	916,028	20,831	8,454
Noncommercial spp.	1,196,377	3,577	7,961	15,691	47,556	474,380	4,697	--
Total	130,554,498	504,890	883,702	695,827	2,347,879	57,473,741	4,072,362	380,626
All species	136,156,422	1,384,726	1,657,485	1,829,596	3,661,115	58,131,492	4,077,772	395,222

(Table 78 continued on next page)

(Table 78 continued)

Species group	Forest type						
	Oak-gum	Lowland oak	Elm-ash-soft maple	Cotton-wood	Maple-beech	Cherry-ash-yellow-poplar	Non-stocked
Softwoods							
Jack pine	--	--	--	--	--	37,639	--
Red pine	8,045	--	--	--	--	--	--
White pine	--	--	9,008	--	516	37,769	--
Shortleaf pine	--	--	1,697	--	1,199	15,347	--
Other yellow pines	--	--	47,487	23,433	88,986	--	--
Baldcypress	--	--	12,308	--	--	--	--
Eastern redcedar	2,176	--	88,591	--	199,644	200,530	--
Other softwoods	14,013	--	--	--	5,934	29,221	--
Total	24,234	--	159,091	23,433	296,279	320,506	--
Hardwoods							
Select white oak	105,397	--	531,218	--	2,226,946	781,020	--
Other white oak	18,545	--	16,454	--	396,649	72,801	--
Select red oak	28,329	--	130,008	2,285	1,610,102	690,099	--
Other red oak	156,201	92,062	538,950	--	1,106,331	672,785	--
Select hickory	62,409	13,772	431,844	--	1,292,984	393,090	--
Other hickory	5,293	--	207,722	--	1,324,355	603,217	--
Basswood	--	--	321	--	269,340	133	--
Beech	48,496	--	74,427	--	4,570,616	432,050	--
Hard maple	21,861	--	555,338	--	9,029,368	1,495,045	--
Soft maple	293,589	32,326	2,155,206	28,723	1,124,453	280,434	587
Elm	41,625	587	855,578	--	780,192	462,003	--
Ash	113,635	--	1,104,296	--	1,085,276	1,435,188	--
Sycamore	68,804	--	1,991,497	15,206	808,318	730,096	--
Cottonwood	--	--	500,791	113,592	16,733	10,154	--
Willow	--	--	52,532	--	12,718	--	10,010
Hackberry	--	--	425,232	--	165,799	216,555	--
Aspen	--	--	23,610	--	131,959	146,758	--
Birch	18,020	--	264,224	--	285	12,883	--
Sweetgum	659,611	29,258	581,415	--	97,204	234,781	--
Tupelo	61,687	3,720	297,415	--	388,046	129,431	--
Black cherry	792	--	216,593	--	635,105	477,121	7,253
Black walnut	35,453	--	327,345	--	462,940	612,523	--
Butternut	--	--	1,117	--	51,716	--	--
Yellow-poplar	157,083	--	1,123,522	5,342	2,306,472	4,701,021	1,081
Persimmon	6,127	--	97,608	--	142,826	34,530	--
Sassafras	69,323	--	500,948	3,461	1,036,989	664,626	--
Other hardwoods	53,627	--	840,186	12,341	524,465	423,515	--
Noncommercial spp.	36,284	123	85,208	--	307,783	160,309	52,808
Total	2,062,191	171,848	13,930,605	180,950	31,905,970	15,872,168	71,739
All species	2,086,425	171,848	14,089,696	204,383	32,202,249	16,192,674	71,739

Table 79.--All live tree biomass on timberland by species group and tree biomass component, Knobs Unit, Indiana, 1986

(In green tons)

Species group	All components	Biomass component						
		All live 1- to 5-inch trees	Growing-stock trees			Cull trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Jack pine	116,245	3,961	6,736	94,471	11,077	--	--	--
Red pine	23,525	--	1,913	18,990	2,622	--	--	--
White pine	812,272	232,813	39,874	482,833	56,752	--	--	--
Shortleaf pine	1,018,695	15,341	49,535	815,720	99,234	1,790	33,199	3,876
Other yellow pines	1,374,827	165,186	73,600	1,014,180	116,701	219	4,496	445
Baldcypress	12,308	--	456	9,236	2,616	--	--	--
Eastern redcedar	2,138,478	614,501	60,600	843,663	257,378	17,155	272,054	73,127
Other softwoods	105,574	15,795	5,220	62,800	21,759	--	--	--
Total	5,601,924	1,047,597	237,934	3,341,893	568,139	19,164	309,749	77,448
Hardwoods								
Select white oak	18,866,527	317,452	946,794	12,829,888	3,614,425	60,473	877,000	220,495
Other white oak	6,248,227	84,661	316,705	4,162,629	1,197,948	27,959	356,633	101,692
Select red oak	6,904,327	114,887	316,091	4,674,205	1,275,545	25,632	397,276	100,691
Other red oak	14,728,135	263,740	686,219	9,898,116	2,744,386	57,298	852,597	225,779
Select hickory	6,051,990	263,332	270,180	3,869,584	1,186,609	21,801	341,993	98,491
Other hickory	7,375,619	326,248	338,085	4,821,413	1,477,429	19,660	304,389	88,395
Basswood	345,639	7,982	15,071	222,688	60,800	2,320	28,158	8,620
Beech	6,803,498	308,466	206,402	2,704,620	748,591	151,562	2,169,616	514,241
Hard maple	15,755,105	1,825,121	637,519	8,340,509	2,689,834	111,940	1,686,290	463,892
Soft maple	4,653,659	598,747	162,577	2,379,355	756,013	35,512	564,287	157,168
Elm	3,059,244	709,208	135,489	1,358,258	460,844	25,737	282,907	86,801
Ash	5,525,480	438,524	260,754	3,301,148	1,031,530	27,327	360,659	105,538
Sycamore	4,335,367	63,188	159,183	2,816,385	774,839	20,996	403,743	97,033
Cottonwood	738,018	16,497	35,735	484,545	124,211	4,118	57,934	14,978
Willow	87,267	30,610	2,907	26,581	9,320	968	13,211	3,670
Hackberry	935,004	115,771	49,342	525,945	161,770	5,527	59,210	17,439
Aspen	765,028	55,688	28,469	531,644	125,204	1,257	17,699	5,067
Birch	295,817	35,354	12,605	183,926	57,379	347	4,592	1,614
Sweetgum	1,856,372	120,988	90,614	1,203,351	359,460	4,172	60,556	17,231
Tupelo	1,559,015	254,313	65,902	834,836	255,129	7,815	110,046	30,974
Black cherry	1,908,489	203,711	68,044	993,482	307,150	17,146	245,118	73,838
Black walnut	1,846,612	56,694	78,050	1,026,255	318,848	21,665	264,657	80,443
Butternut	52,833	1,117	2,014	26,969	8,283	743	10,628	3,079
Yellow-poplar	10,928,700	390,471	506,697	7,388,122	2,088,248	27,065	423,582	104,515
Persimmon	526,452	158,321	22,280	206,329	76,213	4,210	43,735	15,364
Sassafras	4,146,257	1,270,207	145,639	1,465,603	529,682	45,968	518,349	170,809
Other hardwoods	3,059,440	1,769,780	40,580	403,871	142,795	44,218	494,608	163,588
Noncommercial spp.	1,196,377	891,054	--	--	--	25,380	198,893	81,050
Total	130,554,498	10,692,132	5,599,947	76,680,257	22,582,485	798,816	11,148,366	3,052,495
All species	136,156,422	11,739,729	5,837,881	80,022,150	23,150,624	817,980	11,458,115	3,129,943

Table 80.--All live tree biomass on timberland by species group and tree biomass component, Knobs Unit, Indiana, 1986

(In thousand cubic feet)

Species group	All components	Biomass component						
		All live 1- to 5-inch trees	Growing-stock trees			Cull trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Jack pine	5,058	173	299	4,107	479	--	--	--
Red pine	1,018	--	84	821	113	--	--	--
White pine	36,059	10,421	1,769	21,361	2,508	--	--	--
Shortleaf pine	36,623	562	1,783	29,316	3,565	65	1,193	139
Other yellow pines	61,113	7,342	3,277	45,080	5,185	9	200	20
Baldcypress	434	--	17	325	92	--	--	--
Eastern redcedar	100,321	28,900	2,847	39,527	12,066	807	12,748	3,426
Other softwoods	4,818	720	235	2,867	996	--	--	--
Total	245,444	48,118	10,311	143,404	25,004	881	14,141	3,585
Hardwoods								
Select white oak	649,634	10,930	32,622	441,761	124,448	2,090	30,196	7,587
Other white oak	215,152	2,914	10,907	143,344	41,244	960	12,280	3,503
Select red oak	214,573	3,567	9,806	145,279	39,648	797	12,348	3,128
Other red oak	457,135	8,196	21,281	307,224	85,186	1,781	26,459	7,008
Select hickory	190,851	8,323	8,511	122,020	37,422	687	10,781	3,107
Other hickory	250,018	11,062	11,449	163,434	50,089	670	10,321	2,993
Basswood	16,383	385	709	10,554	2,882	111	1,333	409
Beech	230,385	10,451	6,999	91,574	25,345	5,143	73,460	17,413
Hard maple	501,942	58,228	20,312	265,678	85,671	3,559	53,713	14,781
Soft maple	168,201	21,615	5,885	86,011	27,326	1,286	20,397	5,681
Elm	112,250	26,883	4,923	49,345	16,735	933	10,276	3,155
Ash	216,269	17,580	10,177	128,921	40,287	1,067	14,108	4,129
Sycamore	149,872	2,190	5,496	97,362	26,787	724	13,959	3,354
Cottonwood	28,845	647	1,393	18,938	4,857	162	2,263	585
Willow	3,660	1,289	122	1,113	390	39	553	154
Hackberry	35,879	4,447	1,893	20,177	6,209	214	2,271	668
Aspen	30,530	2,246	1,137	21,196	4,993	50	706	202
Birch	10,845	1,295	464	6,741	2,105	13	168	59
Sweetgum	61,747	4,023	3,020	40,026	11,951	140	2,013	574
Tupelo	53,745	8,752	2,279	28,782	8,799	272	3,793	1,068
Black cherry	77,583	8,260	2,770	40,397	12,486	705	9,966	2,999
Black walnut	68,996	2,221	2,907	38,292	11,895	809	9,872	3,000
Butternut	2,360	50	91	1,204	370	33	475	137
Yellow-poplar	419,282	14,983	19,449	283,447	80,105	1,032	16,255	4,011
Persimmon	22,823	6,864	971	8,944	3,300	180	1,897	667
Sassafras	179,733	55,039	6,308	63,543	22,972	2,006	22,464	7,401
Other hardwoods	132,636	76,722	1,758	17,512	6,188	1,918	21,444	7,094
Noncommercial spp.	47,832	35,620	--	--	--	1,013	7,958	3,241
Total	4,549,161	404,782	193,639	2,642,819	779,690	28,394	391,729	108,108
All species	4,794,605	452,900	203,950	2,786,223	804,694	29,275	405,870	111,693

Table 81.--Sampling errors[1/] for estimates smaller than the Unit total of volume, net growth, average annual removals, and area of timberland, Knobs Unit, Indiana, 1986

Sampling error	Timberland area	Growing stock			Sawtimber		
		Inventory	Growth	Removals	Inventory	Growth	Removals
Percent	Thousand acres	- - - Million cubic feet - - -			- - - Million board feet[2/] - - -		
1	1,193.5	8,872.0	627.8	1,647.7	49,493.2	9,400.9	8,149.2
2	298.4	2,218.0	156.9	411.9	12,373.3	2,350.2	2,037.3
3	132.6	985.8	69.8	183.1	5,499.2	1,044.5	905.5
4	74.6	554.5	39.2	103.0	3,093.3	587.6	509.3
5	47.7	354.9	25.1	65.9	1,979.7	376.0	326.0
10	11.9	88.7	6.3	16.5	494.9	94.0	81.5
15	5.3	39.4	2.8	7.3	220.0	41.8	36.2
20	3.0	22.2	1.6	4.1	123.7	23.5	20.4
25	1.9	14.2	1.0	2.6	79.2	15.0	13.0
50	.5	3.5	.3	.7	19.8	3.8	3.3
100	.1	.9	.1	.2	4.9	.9	.8

[1/] At the 68-percent level.

[2/] International 1/4-inch rule.

Table 82.--Net volume of sawtimber (Doyle rule) on timberland by species group and diameter class, Knobs Unit, Indiana, 1986

(In thousand board feet)[1/]

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods											
Jack pine	6,086	1,681	1,375	424	1,196	680	730	--	--	--	--
Red pine	504	504	--	--	--	--	--	--	--	--	--
White pine	33,385	8,113	10,153	10,353	4,766	--	--	--	--	--	--
Shortleaf pine	29,701	13,973	8,833	5,573	1,322	--	--	--	--	--	--
Other yellow pines	86,224	16,463	22,558	30,738	11,492	852	1,042	989	2,090	--	--
Baldcypress	522	522	--	--	--	--	--	--	--	--	--
Eastern redcedar	41,893	11,465	12,807	10,979	3,890	1,439	--	--	1,313	--	--
Total	198,315	52,721	55,726	58,067	22,666	2,971	1,772	989	3,403	--	--
Hardwoods											
Select white oak	964,755	--	90,091	147,384	180,182	171,735	123,094	102,588	110,983	37,715	983
Other white oak	298,870	--	36,451	61,267	77,815	60,689	30,571	18,592	13,485	--	--
Select red oak	359,170	--	20,602	50,690	47,696	46,557	57,333	46,045	52,361	37,886	--
Other red oak	721,117	--	62,814	87,964	140,332	126,402	109,207	71,178	100,255	22,965	--
Select hickory	207,263	--	40,830	46,633	49,081	35,188	18,593	12,289	4,649	--	--
Other hickory	273,506	--	54,751	55,497	55,710	43,682	31,080	13,664	14,966	4,156	--
Basswood	25,439	--	1,560	5,625	4,308	3,698	1,242	4,496	3,084	1,426	--
Beech	233,474	--	16,958	19,383	31,788	39,266	40,401	33,845	42,905	8,928	--
Hard maple	376,287	--	76,594	78,050	87,069	42,842	40,081	26,826	14,240	8,423	2,162
Soft maple	134,825	--	13,450	21,787	24,842	27,669	14,250	13,146	16,741	2,940	--
Elm	50,322	--	9,083	12,087	11,689	6,461	5,000	3,068	1,810	1,124	--
Ash	198,684	--	30,630	45,387	37,440	34,088	19,219	14,181	14,511	3,228	--
Sycamore	244,187	--	18,560	26,360	25,111	34,671	34,159	27,426	51,057	22,759	4,084
Cottonwood	52,447	--	4,923	4,337	1,422	4,583	4,328	2,898	13,741	14,311	1,904
Willow	637	--	--	--	--	--	637	--	--	--	--
Hackberry	33,256	--	5,875	4,192	5,711	6,406	4,817	2,375	3,880	--	--
Aspen	34,127	--	4,824	8,884	12,755	3,648	1,811	1,552	--	--	653
Birch	9,879	--	361	3,644	2,685	2,510	679	--	--	--	--
Sweetgum	73,646	--	13,945	16,867	11,956	10,738	5,550	3,554	1,884	7,845	1,307
Tupelo	49,281	--	9,547	8,947	5,965	6,087	4,777	4,740	7,505	1,713	--
Black cherry	71,894	--	13,816	9,550	17,271	10,821	8,450	6,866	5,120	--	--
Black walnut	61,024	--	13,417	16,539	16,992	7,826	3,872	1,713	665	--	--
Butternut	2,135	--	394	737	1,004	--	--	--	--	--	--
Yellow-poplar	635,979	--	50,809	105,163	115,670	119,008	95,268	62,120	76,150	11,791	--
Persimmon	3,676	--	1,668	1,463	--	545	--	--	--	--	--
Sassafras	40,265	--	13,210	10,732	6,120	8,052	637	--	1,514	--	--
Other hardwoods	17,481	--	5,318	2,451	1,689	2,277	1,273	3,353	--	1,120	--
Total	5,173,626	--	610,481	851,620	972,303	855,449	656,329	476,515	551,506	188,330	11,093
All species	5,371,941	52,721	666,207	909,687	994,969	858,420	658,101	477,504	554,909	188,330	11,093

[1/] Doyle rule.

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The third inventory of Indiana's timber resource shows that commercial forest area in the Knobs Unit decreased less than 2 percent between 1967 and 1986, from 1,769 to 1,741 thousand acres. During the same period growing-stock volume increased 33 percent. Highlights and statistics are presented on area, volume, growth, mortality, and removals.

KEY WORDS: Area, volume, growth, mortality, removals.

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Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it--in short, "finding out and telling." As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager to meet these challenges while protecting the environment is what research at North Central is all about.

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